

# DRAGON USER



*The independent Dragon magazine*

July 1987

## Contents

### Letters

Point's corner ... CoCo conversions ... OS-9 Cosh and NIT problem ... hints on Filmaster and Animator ... Ring filing.

### News

CompuShare developing new OS-9 buffer ... H.C. Anderson's Superwriter II for disc ... South Bay Computer Club drop in ... book offer next month ... copyrighting software ... German group.

### Dragon Soft

Money Maker from John Peter Discount Software ... Wilson's Dream from Microvision ... Superkid from Quickbase.

### Take ten printers

Add one and you have eleven. You also have the largest survey of Dragon-compatible printers ever presented by Dragon User and its readers.

### Expert's Arcade Area

Total Eclipse map from Joe Griscia ... testing Shogun Master Plus ... sneaky routine for Moon Castle ... using the RESS7 ports.

### When is an Epson...

Not all Epsons are like all other Epsons. Following Pam Olney's Yeoman Walker looks at codes for the other ones.

### Moving programs

Mike Hides moves machine code without taking a point.

### Dragon Answers

Pixel colours from ECF ... autostart conversion ... break key disable for Tandy ... resubmitting large programs ... testing CoCo ROMs.

### Winners and losers

Gordon Lee goes over the techniques for solving the February competition, with comments from entrants.

### Write: ADVENTURE

Peter Gerard takes his dictionary and begins to build a vocabulary.

### The Answer

Gordon Lee's own solution to the April puzzle will appear next month.

### Adventure Trail

Deep in the heart of a Colossal Cave Outcrops Peter Gerard's Uncle Elmer, who seems to be finding something...

### Competition

Gordon Lee describes how to divide and conquer, but ends on a happier note — the prize is Music Maker.

## Editorial

JULY rolls round again — one year since DRAGON USER quit the newsstands and went private. I don't mind saying that we were threatened with disaster by well meaning folk. Who would raise £14 a year? Where would our 'passing trade' go? Wouldn't everyone assume that the Dragon was no more? Weren't we going to take the money and run?

They should have said '— and run, and run, and run'. Yap, we're still running, 'spite of all the doom predictions. As for the 'Dragon is dead; well, we're still getting people just starting on their first Dragon, phoning up to find out how they can subscribe.

Some people forget that there's no such thing as a dead machine as long as there's a live user. AND the Dragon has a roster of committed dealers, sticking to their guns.

Just like Dragon User.  
So DON'T FORGET TO RENEW YOUR SUBSCRIPTIONS! The lights are staying on all over Europe. We might even replace that sticky fluorescent tube over my desk...

### How to submit articles

The quality of the material we can publish in Dragon User each month will, to a very great extent, depend on the quality of the documents that you can make with your Dragon. The Dragon computer was designed to be to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to Dragon User for publication should not be more than 1000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program or tape you must include a stamped addressed envelope.

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# Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, Dragon User, 12-13 Little Newport Street, London WC2H 7PP.

## Round six

CONCERNED the reviews in the March issue about Fire Force, the comments of Jason Orkum are mostly correct, in that the game does appear to fire blanks, and that the game is extremely hard. But I disagree that it is bug ridden, as the program runs perfectly with excellent graphics and good sound.

It might help all players if Dave Hitchman could tell us which joystick he uses in the game, and perhaps give us a hint as to the knack of using the gun, as I have spent many hours attempting the game and have yet to complete the first stage.

Ian Mitchell  
71 Gough-Y-Oster  
Glais  
Swansea  
SA7 7HW

We dropped Dave a line, and he writes: "I'm in regard to your letter of 13.3.87. I'll use appropriate & as interesting people as I can say is that it comes with practice. Regards, Dave H." Just like real life!

## CoCo convert

In the April '87 issue of DU I found the article by Rudy Dwyck about CoCoDragon. Basic conversion is an interesting task. However, there is one important detail that he did not mention. A CoCo Basic program cannot be LOADED from disc by a Dragon unless the CoCo disc is modified. To use the program described by Mr. Dwyck, one has to transfer the CoCo disc program to tape using CoCo and then LOAD it into the Dragon. This is not really much faster than just making an ASCII copy to tape from the CoCo disc, in which case the full conversion is not needed. If you use either of these methods, your friends with CoCows will soon begin to tire of making the copies to tape.

An unmodified CoCo disc cannot be LOADED by a Dragon because a different CoCo directory is on a different track from that on the Dragon disc (a file

Every month we will be shelling out a game or two, courtesy of Microdeal, to the reader's who send the most interesting or entertaining letters. So send us your hints and your opinions, send us your hi-scores and suggestions. Send us your best Dragon stories. What if you think we're, mind readers?!

EXTRA  
PUFF

## Reviewer's wrights

ENCLOSED is a little poem which outlines the harsh world of the games reviewer. Please Colman find this amusing as we at Bore Software (ie. Never mind, Jason, it's hard at the top!)  
S.J. Goodwin, 16 St. Stephen Road, Parkside, Warrington, Cheshire WA5 2AN

"What a joyous job it must be,  
A Dragon User's reviews,  
Where only plait  
Is to read and write  
And take stock from harassed viewers

Games pour in  
They're up to my chin  
The Ed's deadline is tomorrow  
(It was yesterday, actually)  
Oh who gives a XXX?  
He's only the Boss (SHE — 'S)  
Who wants to be a reviewer?"

Mr. Orkum from Staple Hill keep  
Cries, "what does Goodwin know?"  
His files aren't half as high as mine  
And how come he's got time to type?  
His work load must be low!"

"You mentioned rhymes", then said the Ed.  
"We had to file a letter."  
"Tomorrow's not your ideal word,  
But it's better than 'reviews'."!

directory formats are different) the file headers are different and the disc allocation maps are on different tracks and in different formats. I have modified CoCo discs to be LOADED by a Dragon and while glad to send a copy of my procedure to anyone interested if they will supply an international return postage certificate to cover mailing costs.

I have subscribed to DU for over two years and find it to be very helpful. Also, I am a member of the MPPUG and the OSUG and both of these organisations have provided much useful information and help as well as support for the Dragon.

Randy Langshere  
15547 Chequer Drive  
Chicohead  
AAC 03017  
USA

## Tagging along

In the November issue of Dragonizer D. Patteny pointed out one of the shortcomings of Microdeal's Filemark program. The problem is that when you wish to update a file, and use the same name, the program just tags the updated file onto the end of the old file rather than RLLing the old file first. By changing the following line in the program called CLDFILE, the problem appears to be cured.

```
3640 MMS + NMS + " DAT"  
CALL MMSWRITE MMS,RL  
8008 IF ERR = 160 THEN  
CALL MMSERRORDGOTO  
8005 GOTO C0860
```

By adding the following line to the same program, the number

of each record can be printed: `CALL PRINT (C08A/RL) + 1`. In the same issue there was a spreadsheet program called Analyser by L. Puz. This listing has corrections that need to be corrected before the disc user is to load and save the spreadsheet. By changing the start of lines 5 and 7 a cure can be effected:

```
5:FORA = 55:OTM:POKE55:A  
FORX = 1099: etc  
7:FORA = 55:OTM:POKE55:A  
FORX = 1099: etc
```

When trying to load in a saved sheet from tape an IE ERROR can be prevented by changing line 166 and adding the two extra lines:

```
166:POKE54,X  
IF GOFY=1 THEN Y=0  
167:INOUTX=0  
168:RETURN
```

Mike Hides  
29 Carston Road  
Grimsby/Doddhouse  
Southend SS16 6PY

THANKS for the useful information. We have had several enquiries about Analyser which I refer to as testing. Some of the enquiries about late typing errors on the part of the enquirers — it's a long way to go, Co., to get your listings double checked, so please triple check 'em before you write to DU.

## VAT vex

CONGRATULATIONS on your article by D. Patteny called OS-8 Blues. It was nice to see something written just for the OS-8 users. I am sure there are many other OS-8 fans who were delighted to read the article, especially those with Style line feed problems. Let's hope that this is the first of many OS-8 articles to be published in Dragonizer.

One OS-8 problem I have is with the CASH + VAT program, and I was hoping that through the columns of your magazine I may be able to locate anybody involved with the writing of the original program. I am unable to locate Computer Support Systems of Walsley, who wrote Cash + VAT for Dragon Data, so if there is any reader out there who can give me a lead I would be most grateful.

Clareville Patteny  
64, Endcombe Road  
Newbury, Berks

# News desk

If you have any new products for the Dragon — software or hardware — ring the News Desk on 01-437 4343

## Offer next month

LOOK out for a special offer on Dragon books in the August issue of Dragon User. Three popular books, now out of print, have come our way in limited quantities. There aren't many of these about. We will be offering them to you at about a third of their original price, with a free game thrown in while stocks last. This is a rare opportunity to build up your personal Dragon library before the books become unobtainable — at

least until the wizard Magin's, creator of the first 6000 books from sleep beneath Cast Fulhamage and conjures into existence the long awaited Dragon 3G. Dragon users who don't want to wait until the Millennium have only to wait until August, when further details will be furnished. Someone's mulling something about DRY Home Accounting with these were included, as well. More next month.

## 50 years in a vault . . .

A REMINDER from the National Software Register that an author's copyright, although it exists from the moment a program comes into existence, can be successfully granted if the author cannot prove that it existed at a particular time — for instance, if another author copies it and sells or publishes it before the original writer can do so.

The National Software Register will store two copies of your program confidentially and supply a numbered certificate for each program.

Further details from The National Software Register, 236 Chancery Lane, Bristol, M6 2BN, ENGLAND.

There are, of course, other ways to prove that a program was in your possession at a certain date. The simplest is to mail a copy of the program to yourself by registered mail (where the date is certified) and then store the package in a safe place UNOPENED unless and until you have a bonny about possession and have it opened by the courts or some other authority legally sworn to witness the contents of the packet. Make sure the postmark is clear, and keep the posting certificate for luck.

This is cheaper than having the program witnessed by a Notary in stored in a bank vault, and just as effective (as long as you don't lose it).

Contrary to popular belief, copyright exists whether or not the material displays a copyright (©) sign or any other notation. The little symbol is simply a warning to other people that this is copyright material. Copyright stays with an author (or

until he or she sells it or assigns it to somebody else) for just 50 years after the death of the author.

The NSA do say that they will store your programs until 50 years after your death.

## Disc Super-writer

HANS CHRISTIAN ANDERSEN Software of Denmark collects us to say that they now have Dragon Data's Superwriter 4 converted for disc.

"It's the same text reader/writer I wanted Dragon User to know this, because some people have been wondering," said the chap from HCR. "The disc can also be loaded into memory and then saved and loaded to another disc."

The package will cost £10.50 plus post and packing. Watch Dragon User for further details.

## Clang!

Phil Reed (and various people on his behalf) apologises for a slightly misleading statement of the HOU'S subscription — it's £580 to join, and £750 for subsequent subscriptions. Also, points out another member, republishes scintillatingly at cost, but are underbilled as cheaply as possible. National Dragon User Group, 6 Narvinge Road, Worthing, Sussex.

## California CoCo

THE Dragon User office had a visit last week from programmer, hacker and water-cooler conversationalist Andre J. Lavette from California, bringing news letters from the South Valley Computer Club and the National CoCo Users Group in the States.



The SBCU meets once a month in Torrance and once a month in Long Beach, for demonstrations, lectures and what Members bring along their

computers, and the club's staff with library travels along. The newsletter has club and CoCo news, show reports and programs. The March issue carries a suggestion for a Hot Cross Data Processing Party on behalf of the US Special

Olympics (the equivalent of the UK Wheelchair Olympics), for which the group does a lot of support work, and the May issue suggests a picnic. There's more to all this than software.

The club can be contacted via Andre at 20033 Alameda, Torrance, California CA 90502, USA. Andre has quite a list of discontinued software for sale as well, which would be of interest to US Dragon and CoCo owners.

## Buffer

CONFUSEPSE are developing a cache buffering utility, ExpressDS-B, for use with their Dragon Plus and DS-B.

There is no scheduled release date at present. We would be interested in hearing from anyone who uses the Dragonette Dragon Plus DS-B and if possible "who uses C or Pascal" (says Stan Oynthal) to test the package and review it for us. If you are interested drop the editor a line pronto.

## Fade out

AS SOON AS DU June arrived we saw that the listings for the Graphics Screen Word-processor were almost unavailable in places. Often the "prints" got the blame for this kind of thing when it isn't their fault, but in this case the pages left us in good condition (as you can see from the final page), so we will be asking questions.

Anyone who wants a clean photocopy, please drop us a line. No SAE required.

## German gruppe

APOLOGIES to the Sieghied Computer Gruppe of Germany for missing their first show on May 30th. We can now make that up somewhat by publishing their existence. They publish a stout AG magazine, Sieghied's Drechselper, every two months. This is in German (although this issue contains a single cartoon in English).

Contact the club via Bernd Neuner, Dina Erbsberger Strasse 23, D-8524 Murnau am See, Bundesrepublik Deutschland.



# Dragonsoft

New software for review should be sent to Dragon User  
12-13 Little Newport Street, London WC2H 9PP.

## Compose yourself

**Program:** Music Maker  
**Supplier:** John Peto Software  
**Price:** £5.00

MUSICMAKER is another program that allows you to write your own tunes in four part harmony. The tunes will sound as synthesised as they do with, for example, Microsoft's Compose program, but this program is leagues above any other in its field for the simple reason that this is a composer designed for a composer, not a programmer.

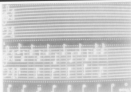
Basically there's no conversion needed of music into lines of code because all music is entered into a rather nice graphics editor. Nearly anything can be entered, and I haven't found anything missing while I've been inputting my own compositions.

The program is controlled mainly with the cursor keys with

other functions being provided by other appropriate keys (eg 'F' for rest, see, pretty easy isn't it).

It's very difficult to write a long review about a program like this because all that you can say is, yes, it sounds okay, yes, it's user friendly, yes, it's graphically nice to read. The only other thing it can really do is give you a hint of its capabilities. So here goes.

You can set the key and time signature, enter notes of any length including ties and dotted notes and bass and treble clef with an option to use some descenders, and a facility to cover notes not available on the scale. You can enter rests, insert and delete notes, repeat bars or bits of bars, change the tempo, transpose the tune at any time, save to and load from tape, play the tune (pretty obvious one that), and put full bars on the start.



The visual makes it very easy to understand and write the program, and the table at the back of the program allows the user who is less well acquainted with the theory of music to enter his own tunes as well.

The final important feature of the program is that any tune written using Music Maker can be used independently of the

music program within your own programs.

So, in summing up, this is the definitive music-writing programmer the Dragon, and if you thought Compose was essential you simply must get this.

Jason Gribbin



## Go to work with an egg

**Program:** Superkid  
**Supplier:** Quickbeam  
**Price:** £8.95

Take the glasses off, put the books on, get out the caps, and prepare to take the illustrious role of a SUPERMAN, or at least one's younger brother, in this, quite simply the best of Dragon games yet!

Yes, you've guessed it. Your objective is to save the damsel in distress, avoiding the various perils out to destroy your wildest dream! As Superkid hasn't quite yet mastered the art of flying, things soon get increasingly difficult. The first screen places you prominently among a series of snails, which

you may either jump, or blast with an egg, which is your only weapon, and which you can only get by jumping on. This task is surprisingly difficult!

Once you have got rid of the snails, you travel onwards, encountering a butt-happy bee, weaving through the screen, destroying your hopes of success (or at least mine). Alas, alas, and don't forget those blasted owls, giving you energy vital to your mission.

Superb graphics, unbelievable sound, with the best built-in speech I have heard on any computer, makes this all undeniably fine. Still, even a section for you backing breaks too. So, come on down, 'cos at 08:55 the clock is right. As you can guess, I heartily love this! This can't say for me, but the dog's life is forgotten in store! — Ed.).

Simon Jones



## Pennies from above

**Program:** Miser's Dream  
**Supplier:** Microvision  
**Price:** £7.95

Miser's Dream is the sort of excellent program that doesn't feel owing to lack of quality and/or revision, but has been an all-Microvision, but I gather the chap in charge of marketing hasn't suggested that you do actually have to draw people's attention to games a few times before they get around to playing with such — Ed.).

Another game from Jason Fatous of Eddie Steady (a name, it simply involves collecting coins until you reach a bag at the top of ten progressively harder screens, and guiding them sympathetically into the bag at the bottom.

The joystick controls a pointer, to move ledges, set-stair style, either up or down to guide the falling coins into the bag, though there are moving platforms to aid or hinder the falling on several screens. Out to stop off this is The American Express (a hint, not a card), chuffing happily across the top of each screen, which drops dollars down as it passes. These destroy any coins that touch them, but can be shot away if you reach them quickly

enough. Accotobacked is the Money Spider, which eats any coins it encounters on the way to the bag. This must be killed within the time limit, with bonus points equal to remaining time once the little pig has been killed.

The start menu allows keyboard control if desired, the keys being redefinable, and a skill level that ranges from 'simpleton' to 'Expert'. Then onto the PMODE3 game screen, nicely detailed and laid out, the coins bouncing realistically from ledge to ledge. Again like Eddie Steady (a name), screens look individually easy, while the later ones require some careful thought. The result of getting to the bank screen will have been to have 'legend' to discover, though.

This is a very original, definitely a 'just one more go' game, dealing with a subject close to my heart, and results for £7.95, at which price it gives good value for money. A nice finishing touch is that should you beat 'Mr Water' in the 'Hall of the Rich' table, it is possible to meet and draw your own version when you next play.

Mike P. Lowe





# Take ten printers . . .

. . . add one, and you have the Dragon User readers' guide to painless printing

OVER the months we have received a pile of letters asking for more advice on which printer to buy for the Dragon. As we asked the people who know best—the users, and the result is the eleven extended reviews of different models by satisfied customers that you can read here.

We haven't attempted to direct you to specific distributors, and to be fair about prices: there are reliable computer dealers countrywide, and prices vary considerably for many models, and change regularly.

The most important thing you can do, if you are not an electronics wizard, is establish that your dealer can make up and supply (as part of the price if possible, although this is not always so often) the correct connecting cable for the Dragon, and wherever possible to demonstrate the printer with your Dragon, ensuring that you understand how to make the correct dip settings.

But you will find all this, and much other good advice exists, in the reviews which follow.

(What? you going to mention the Disc Operating Systems? — *Ans. Ed. Go away. — Ed.*)

## Amstrad DMP 3000

ANYONE who wishes to use a Dragon seriously will need a printer, especially when using word processors or spreadsheet software. My first printer was a Seikosha DP 100. This served me very well while I was simply dumping programs or machine code listings; however, when I moved to Flex and then using SP-4000 from Compuserve, an excellent word processing package, I therefore needed a better printer. The Amstrad came on the market last summer and after seeing a demonstration of its print quality I decided to buy it, in the Comet sale, when it was priced at £144.95, a bargain price for a machine which gives Epson compatibility with both tractor and friction feed.

The DMP 3000 is a lightweight machine with a pair of hinged legs underneath and can hold over a 500 sheet box of paper. The paper enters the machine at the front, which also makes single sheet feeding easy, and the paper exits at the back, so you can print on the cardstock, useful for record cards etc.

On the right side of the machine is the main On/Off switch, while at the rear is the electronics connector and two sets of DIP switches, used for setting various parameters. These are very clearly described in the manual.

The printer cable supplied is for connection to Amstrad machines, so a Dragon (20 pin) to electronic must be obtained, or the supplied cable refitted with a Dragon connector if you have the correct tools and wiring diagram.

On the right-hand side are three buttons for On-line, Print-feed and Line-feed, together with three indicators for On-line, Paper-out and Power-on. Above them is the tractor/friction selector lever. I find the machine functions perfectly well with this selector in friction, even with tractor paper. The ribbon is easily fitted and all the above is the print pressure selector lever.

The manual is very clear. Each printer command is described with sample software in four languages: Amstrad, Commodore, Microsoft Basic and BBC. For Dragon use the Microsoft version, remembering to use PRINT-2 in place of LPRINT, and the printer springs to life easily.

The printer comes with six basic typesets, but to these can be added many variations.

The printer also has a number of foreign character sets which are accessed by control codes, the various characters occupy ASCII codes used by less used symbols, curly brackets etc., but if you are using Compuserve Flex they correspond to the built-in foreign character sets. The character set may also be protected on the DIP switches.

There are also the various graphic options, single, double or quad-density modes. These follow the usual space style, 80 dot, dump routines.

All in all I have found this printer to give reliable, good quality printing at a very reasonable price. It compares well with printers costing several tens of pounds more, and I would recommend it to anyone.

I have increased the printer's internal buffer from 2K to 8K, which speeds up word processing by not having to wait for the printer, especially when in MJQ mode. This is a easy modification, the parts cost under £100, and I will supply details on request.

Anybody interested in this mod, please send your request to DU with a stamped, self-addressed envelope, and we will pass them on to Frank Phillips — (Ed.)

Frank Phillips

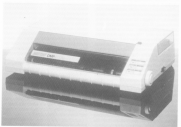
Current Comet price: £154.95

## Amstrad DMP 3000

THERE are some questions in this letter that are difficult to answer. Why are we here? Why don't Mac OS users complain more about their Macs? And why doesn't anyone build printers that lead from the front? Well the first two I will have to leave you to ponder but the third one is now resolved with the new 3000 edition from AMSTRAD. Now I know that name is going to send someone you running for the ocean paper bag RRRRRHHH!!! Mac. Look what you've done. You've upset our word processor — Ed. (Ed. don't know it all you have tried it.)

The people at the local computer shop had been trying to convince me ever since I mentioned replacing my old Seikosha. I had been put off by the name, but then I had offered the loan of a machine what could I say?

I could go on about the joys of the front loading paper but well never, it will suffice to say that this machine has a built-in stand, allowing the loaded paper to be placed underneath and retracted behind, and all loading can be achieved from a sitting position. The model I bought was a DMP 3000 the new machine had replaced the PC clone it could be set to default to either of two IBM character sets or Epson fit standard, selectable by dip switches. In order to get a line feed with every carriage return it was necessary either to set another dip switch or to PORE 200.2. Print quality very good if a little fuzzy on Mac Letter Quality. All



the Epson FX typewriters are catered for including auto underline and italics, even downloadable characters to allow you to define your own additions to the set. All these facilities were called using Epson control codes, so if your wordprocessor was written for an Epson it should work with an Amstrad. Some extra characters are available in FX mode making it possible to print 1 and 6, without switching tabs as you could use it with Peter Winkler's processor (Dragon User September 1989). Another nice touch is that NLG is selectable by control code or manually. This means that I could run off my own copy at draft speed (100 ips) to check before switching to NLG (30 ips) for the finished article.

Graphics capability is outstanding with single, double and even quadruple density being supported. With all of these there is the choice of eight or nine page graphics and full details of how to implement them are in the single handbook.

The handbook is two thirds the size of the Dragon manual and covers everything from wiring the plug to control code combinations. Indeed my only criticism of the manual were that it does not actually show how the output will look and where one can find the size of the buffer. I suspect it is about 2K, but it would be nice to know.

The machine comes in two guises, DM19000 and DM19001, which cost £169 and £175 respectively. The 3000 has two IBM character sets, the 0000 does not. Which one you choose will depend on your future aspirations.

Anyone want to buy a Seikozuki?

Ken Smith

List price £169 (DM19000) and £175 (DM19001)

#### Brother M-10000

NEEDING a printer for correspondence as well as listings, but not the sort that would take over the living room, I visited my local Boco. They have always been willing to demonstrate anything and have a good selection.

The printer I was most impressed with was the Brother M-1000. It is very compatible with my Dragon 32 and has both cermosens and RS-232C interfaces if needed. Only a normal printer cable is needed to connect up and this can be purchased separately if the alternative to the Dragon User. The Brother M-1000 is a dot matrix printer with a 9 x 9 pin head and in normal mode will print up to 80 characters per line at 50cps. 96 ASCII characters are available and prints in normal or italic in any or a combination of the following ways: as comes, emphasised, double strike, plus, elite, super and sub scripts. Underlining as well as margin, form length and skipover are some of the many features available. Double speed, double density and half tone can all be used in BIT image mode.

The Brother M-1000 measures 300 x 190 x 100mm and is less than 600g in weight, so the rest of the family can carry on watching Dallas. The print direction is both bi-directional logic testing and undirect-



tionised you can dump your data in hexadecimal if needed. The 65 page manual is reasonable with examples of how to set all the printer codes. Also included are pages on the technical side of things and copies of all of the national character sets. When I bought mine it had a 1440i tractor feeder roll paper option and extra. For a while I used roll paper and the roll paper option. The roll paper option is marvellous. It works well, still enables prints use headed note paper, it is quick, efficient and there is no waste. But, wanting to be like everybody else I went and bought the tractor feed. Now I have to worry about skipover and perforation codes, form length, printing at the top of the page and the waste paper is marvellous. You also need room for all the extra paper and somewhere for it to go when you are printing, otherwise it can drag.

For ease of use though I use Margovan Consultants' 'Printer Control'. This makes light work of all my word processing problems and allows you to make full use of all the printer's facilities. It also includes things like an adjustable speed in the key repeat so that slow typists do not get tired of leavers. Centering of headings or blocks of data such as address blocks, are made easy. So are things like block transfer or delete, left and right justify user defined graphics and strings, multiple prints and variable page and line spacing. There are many other facilities built in including being able to enlarge your print up to eight times. But image mode is made easy and there are three different character sets that can be used.

Included in the package is a picture made allowing you to load, change, modify, invert, move, or collage your picture, you can even add words or duplicate parts of it. The package includes a supply of preprogrammed graphics and user defined strings that are simplicity itself to use. This whole article including pictures was done with this program.

Alan Blackwell

Look for price around £160 or less.

#### Centronics DLP

HAVING recently purchased a printer I now know the pain and frustration of looking for a good value printer. Especially one that can be used with the Dragon. At last my quest is over and I now own a Centronics DLP (Great Little Printer).

But let's start at the beginning. One day I awoke up and thought to myself "I need a printer". Fool that I am, I thought it would be the simplest thing. Had I so eagerly flicked through the pages of the latest Dragon User, nothing. Did this put me off? No, I looked through several old issues of Dragon User Anylock? (Hah again) No, my pulse raced as months, years, decades passed. Well, a good few hours anyway. But alas, I found very little mention of the best printing device. The less I did find would have degraded my existence into complete misery.

Just as I was giving up hope, and thinking that these printer things were a myth, a brainwave hit me. I decided to do a staff thing and look through other computer magazines (Computer magazine the wish of the editor). A rash decision I know but I thought I should chance it. Well, success! I found some printers of a marginal interest, just at the top of my planned expenditure, a few were even Epson compatible (gasp). But still I thought and even committed the sacrifice of borrowing an Amstrad User (oops on the grounds of time, and looks for angry mail). And there it was, low priced, eight x 11 printer for under 100 pounds (by St. Epson compatible, NLG/Hear/Letter Quality), screen dump capable, all this and a star saying PPRM! Tractor feed + Cable + Roll tape + Paper! How could I resist?

Reverently my hands trembled towards my budding society book. I ripped away the dust and cellophane and slowly opened the tight pages. Yes, through those barely legible, time eaten characters I learned I could afford it.

Rapidly I turned back to the article, thoughts of spending money driving my

mind into a frenzy of worry and confusion. The clever little black dots caught my eye: All printers come standard with (justified) output: "Triple M/C, 'Scope Draft," "Separate tractor and Proton feed," "Logic seeking head (whatever it was it sounded good)," "uses A4 sheet or continuous," "original + 2 copies," "48 international characters," "subscripts, superscripts and underlining," "bly mud apog." The list continued, dispelling all doubts except one: would it work with my humble Dragon? Would this much power bill my little mouse?

Hours passed, tears dripped, I thought. Finally the list for a new printer was out. I would take the list, dive into the unknown and see directly to the building society, direct pass and did not cost 300 pounds. My head pounded. Could I forgive myself if I found I had blown it? Hands twitching went to the counter. The next few minutes antedated from my mind. I remember nothing, the pressure must have been overwhelming. But when I came to my senses, walking home, I found a strange piece of paper in my hand. After asking an innocent bystander I found it was called a cheque. Not only that but by some strange coincidence it was for the exact value of the printer, £132.95 (including the post and packing). I tried to remember where was to, it wouldn't fit in the hole in my door so I wrote the draft: comes in, so I went to the dreaded magazine, cut out the little square form (you see, useless with other peoples' property), filled in the details. Two boxes worried me, they said "To: BBC/Com/BM." Hmmm, what one? I closed my eyes and looked at random. The BBC? Hurdled. I stuffed the cheque and the form in an envelope and looked at the address on the front. Would the postman be able to read my writing? If all went well I could never have to write again. I shut an 18 pence stamp on (nothing like overdoing things). I crushed the postbox and threw it in.

It was Wednesday morning. For days I couldn't sleep. The tales I had heard of the QPR would make your hair stand on end. Thursday passed, nothing! Friday came and brought the door. Had the mafia found me? Cautiously opened it. A tall man with a large coat stood there. He said "Sign, see mate". Was I signing my life away? Impulsively I signed. And he handed me the box. It was heavy, very heavy and it even said "Violence, the end. No, it was to be kidding myself, two days, not even Superman's that fast. Was it a box? Slowly I tore away the sticky tape. Pulled apart the brown cardboard. Intriguing, more boxes within. I took one of the boxes out for closer inspection. It contained a long piece of strong plastic with black rounddots at the end. I delved further into the mystery box. Paper, tractor feed paper and a roll! And still more boxes within. Lots of polystyrene besides. More plastic, some transparent, some black, some cream. A piece of fibrous cable with plugs at both ends. This was a real Aladdin's cave. Still more. Some books tried somewhat colourfully User's Manual and RX Compatibility. Some sheets admittedly hundreds of tiny squiggles like 55C-2+ + n1 + n2 for quadruple density graphics mode! Had I by some

chance found a stray copy of a space ship operating manual? Again I looked into the box, one large obvious package remained. I pulled at it, felt it move and again I pulled. It came loose. Unfolding the cardboard and pulling away the polystyrene revealed it in its full glory. A printer, my printer, by some magic it had arrived before the seven days on the form. A few minutes passed and I considered the possibility of union action in the QPR. A go, test motor possibly. But then I turned back to the printer. In my usual style I ignored the manual with the big letters saying "READ THIS BEFORE YOU TOUCH A THING". It was a strike Christmas. Quickly I picked the plastic into the right holes. The ribbon was a double, the tractor feed a delight, burr-tooth feed caught me out. I had looked at the manual. No help. I persevered, finally located the clever internal designs and located the piece of metal in place. It looked secure, but quickly my brain spotted an absence. The same plug I'd used for my appliances. The TV? The Dragon's power supply? The clock radio that you feel like wondering first thing in the morning? Possibly a long period of time with a black box on the end showed itself. My hands fumbled in swift gracefulness and within seconds the plug was in the printer!

My instincts told me there was just one thing to do: connect it to the Dragon. The supplied lead, printer end, slid in as if it had no other purpose in life, probably because it didn't. But the other end caused a sudden pain to pass from my brain to my hand. The plug was too big, so matter how hard I tried it just wouldn't squeeze into the hole in the side of the Dragon marked P10. It didn't fit in the other hole, but sometimes I thought that I should do it right or left depending on how you view it. Tears poured. I contemplated suicide and just at that moment my red-tinted eyes caught something. The 20 pin plug had been using to sit my coffee with. Could I sacrifice it? I looked off the coffee and tried it in the hole. It fitted. But would it do the trick? Could the Dragon do with 20 pins what the book needs 24 for? Of course, when has the Dragon ever been beaten (but up at the back there!).

I removed the cassette in the printer lead. Sure enough not all pins were in use. After peering with my "hand" for a proof of the book's printer port pin-in-use task after the state I had left his magazine in, I traced the wires and connected them to what seemed like the appropriate pins on the Dragon. After a few third degree burns from a vicious soldering iron I had built up a fairly accurate model of the Fort Knox bridge. All very well, but would it stand up to being plugged into the Dragon? It did. I waited for the big one. I turned it on. And light glowed evilly. I heard it make a pretty good impression of a milk cart. The head dropped in the middle (but not mouse where all the logic is). A green light appeared next to button (analogous to similar to a Z80 keyboard button) marked "ON LINE". The screen was set, my hands trembled, quickly dancing over the keyboard, the screen displayed "1-2, 'TESTING'". My heart fluttered as I waited for the time to press ENTER. It did, an eerie silence! Too long, I knew something was up. Rapidly I pressed the buttons on the printer in a

random sequence. I pulled and pushed the leads. I tried again, nothing. Why me? Why after all this time? I looked at the plug in the Dragon. Of course, it was the only thing I could try! I had plugged it in upside down. Turning it around repeated the process and on finding ENTER most mass! I felt my ears "beeeeeeeeeeeeeeeeeeee!" Looking down I saw those black letters had appeared in a familiar locale. "TESTING" they said. I keyed in "T" "QPR" and I replied in a tongue I could not understand. It occurred to me that this was because the paper had not moved. And both words were on the same line.

My fingers danced "1-2, CHRS/M, 'Shift/Jump' and the paper had moved visibly by one line! But how could I live in a world where I had to print a chr 11 line feed after every sentence? No, I wanted more than that. I had to have a carriage return to make a go. 'Shift/Jump'. Grabbing the manual I saw a picture of a little box with eight small bits of plastic sticking out of it. They call it a DIP switch, or Dual in Line Pin. Under number seven it said "CR (AUTO LF) ENABLE/DISABLE". With my training in jargon I took just a few hours to realise that this switch was responsible for the misery caused to too many people. I grabbed a screwdriver and changed it. But the foregoing words of the manual stopped me, saying "Never use a screwdriver to change DIP switches. Something to do with graphite being conductive. I decided to play it safe and use a screwdriver. Flicked it. For once in my life that little piece of plastic didn't fit. I tried again "1-2, 'Please work, nice little printer'". It still did not connect to the cassette as two other words. Burst at the end of the glass the paper moved up. I tried again. Success. I could read the whole sentence. I was spiralling to new heights. I looked at the list of functions of control codes. I tried some M/C, tabs, extended, reduced letters, file, file, double strike, single and double density, user defined characters, international set, try letters, let turn up, down, underline. Hours of fun for all the family!

So faced my little tale and take a look around our printers, even the Dragon can be coaxed into working with them. And with printers at these prices, why I might even be able to make a profit for myself if I can write some articles for Dragon User. Best wishes on your struggle to buy a printer, and hope you have had more luck than I have, but measure you it's worth it in the end!

Jonathan Bates

#### Look for price around £135

Look, Dragon? Buy a BBC-compatible printer, mail order, it comes in two days and all you have to do is change plug and test (the QPR and it works!) I should say you had luck!

Me, the real message in the Bates' account of a full-blown printer purchase psychosis (line feed/space, none compatible mechanism) is that it can be done with the help of a little knowledge and a good deal of patience. However, anyone who is not confident of their ability to re-assemble an incompatible cable and who should stick to consulting a reliable dealer, a number of our other contributors did.

#### Mannesmann Tally MT 80 Plus

I NEEDED a printer urgently as I had volunteered to produce minutes etc. for a local Society — this on top of my need to print my own listings. I could afford up to £250, so I ploughed through piles of magazines, buyer's guides and all the outlets I could glean from local computer shops. I had some experience of a friend's Shinwa C180, so had a good idea of what I was looking for. Most help was obtained from Fast-Got (in Fairmount) in the shape of Sales Manager Jim, who demonstrated a couple of current models and spoke of updated versions coming shortly. One of the leaflets he gave me said for the Mannesmann Tally MT80 (80plus), which had a good specification and LOOKED good as well. A few days later, Jim phoned to say that his new stock had arrived so I duly popped over there to find a couple of the latest printers on demonstration. One was the MT80 Plus, happily printing duty at 100cps, in all its print modes. I filled the bill for me, as did its £245 pricing, but I was able to negotiate it down to £237 including a mains plug, a couple of small goodies and about 480 sheets of fanfold paper. I already had a Dragon printer lead so, back home, it took very little time to unpack the machine, fit the mains plug and connect up to my Dragon 32 — simplicity itself with the help of the Operating Manual.

The said Manual is detailed and comprehensive, with all aspects of operation including a section on the interface options. It is a translation from Japanese, despite the German name, and is generally well written, although there are some real howlers here and there to help things along without damage to the main theme.

The numerous example programs are excellent and are easy to adapt for the Dragon, and clear instructions are given on how to set the twelve slide-switches in order to make before use, which I did. Five of the switches cover no less than fifteen international character sets, the rest being for various basic font options including a hashed zero. There are 103 semi-graphic characters available, and graphics in the bit-image mode. In the absence of any good graphics-dump programs for the Dragon, I have only been able to try a couple of small routines from past issues of Dragon User, but the MT80 Plus draws very well. It has a 6.5 inch x 10 inch, but uses only 7 x 8 for normal printing which is still pretty good. It will print Plus, Elite, Suband Super script with enlarged, condensed, emphasised etc. modes on the first two.

The MT80 Plus is a versatile machine, and almost, but not quite, Epson compatible in that italics are obtained in different way and the codes for the international character sets are far higher in each case. The odd reference in the manual for PC1800 suggests that the MT80 Plus is the same machine in a different case, but that should not deter anyone. Paper feed incorporates adjustable tractor and friction which will accept fanfold, roll and single sheets up to ten inches wide. It is possible to print original and two copies from the available



192 ASC and 192 JIS characters as well as the graphics.

There is a very attractive, and slightly smoky brown transparent cover which is slotted so that it can be in situ while printing. This not only reduces the noise level further, but incorporates a handy tearing edge and a very useful scale graduated every two characters from 0 to 80.

I have tried Teletext which is quite good in many respects, but is complicated to use and suffers a major drawback as far as I am concerned. It has no repeat facility, which is a pain in the neck when one needs to print around 70 copies at a time, so I have retained my trusty Dragon to produce good results and write each page into a simple log which then controls the number of copies required. Pam D'Arcy's Epson Print Base (DU Feb '87) adapted easily to the MT80 Plus, and simplifies access to all its facilities which, in turn, speeds up production. Thanks Pam! The only problem occurred after about four months when the top row of pins in the print-head stopped printing. I took it back to the shop where Jim threw his hands up in horror at what he

said was an almost unheard-of fault. However, under warranty, the print-head was replaced and I had my printer back within two days. That was eighteen months ago, and my printer has worked faultlessly and very hard, ever since. In that time I have got to know the MT80 Plus as a great deal better and my delight with the machine continues to grow. This is the basic model with a 112 byte buffer and parallel interface, quite adequate for the average user, but other options are available for the more ambitious. The MT80 Plus is available with either a 2K or 4K buffer and a Serial port is optional on all versions, so there is a model to suit all requirements. The ribbon is easy to change, and is in cassette form so no ink fingers. Replacements are reasonably priced and readily available almost anywhere. Yes! I certainly like this super piece of hardware, and would recommend it to anyone, especially as it can now be obtained for less than £200 if one shops around.

Isabel Ann Holmes

List price £245. Look for discounts.

#### Parascope KX-1080U

AFTER saving up £200 I decided to buy a printer and selected the Parascope KX-1080U because of the wide range of facilities it offered for the price. It's an 85 column dot matrix printer with a 6K buffer and the ability to produce 400 lines at 15 cps. The two main fonts are 10 cpi (pica) and 12 cpi (elite) both of which are available in italic style. It can also work in compressed mode producing 17 cpi or elongated at 5 cpi. Four other printing pitches are easily available. The machine can produce graphics dumps in a variety of densities. With all this plus tractor and friction feed as standard along with Epson compatible control codes, it appeared to be a bargain.

The machine was well packed and after removal from its box the job of setting up was attempted. The outside case of the

machine is of strong plastic and it has a solid robust construction and a weight of 11kg. The 104 page A4 manual gave clear instructions on how to remove the carriage stopper, install the ribbon and fit the paper separator. The machine was then ready to print. The printer has a standard Centronics parallel interface and connection to the Dragon was simple. Using the table in the Dragon's manual (figure 1) and the table in figure 2, I made up a lead using 26-way ribbon cable, 20-way 10C plug and a 26-way Amphenol plug (figure 3) shows the pin arrangement of the printer socket). Ready-made printer cables can be purchased for about £10.

At first the machine would print but not produce any line-feeds, then I remembered that the Dragon will produce a line-feed automatically if you PC1800 000.2. This works but it's not possible to do this when using the slow removal of Teletext 00000

to the printer manual to find for the DIP switches. These are located below the printer head and are difficult to reach. But once I set them to my requirements I have not had to reset them a second time. DIP switch 3 makes the printer produce a line-feed-with-every-carriage return. This is the only switch whose position I have changed since all the others have effects which can be achieved using software codes.

I have been using the machine now for 10 months and it has performed faultlessly. The manual illustrates the action of all the so-called escape-codes (these are mistakes of mine) with basic examples and, providing you substitute PRINT C-1 for LPRINT, it's easy work. On the top of the printer there are several switches. The three pass ones on the left turn the printer On and Off line, produce a Firm feed and the third a Line-feed. On the right there is a slider switch with three positions: Bit, MUQ and Comp. The first position produces draft quality output on a 9 x 18 matrix at 100 gpm. The second sets up the near letter quality mode which prints on a 10 x 18 matrix at 20 gpm. The third position produces compressed print at 17 gpm.

PRN 1	PRN 2	PRN 3	PRN 4	PRN 5
PRN 6	PRN 7	PRN 8	PRN 9	PRN 10
PRN 11	PRN 12	PRN 13	PRN 14	PRN 15
PRN 16	PRN 17	PRN 18	PRN 19	PRN 20
PRN 21	PRN 22	PRN 23	PRN 24	PRN 25
PRN 26	PRN 27	PRN 28	PRN 29	PRN 30
PRN 31	PRN 32	PRN 33	PRN 34	PRN 35
PRN 36	PRN 37	PRN 38	PRN 39	PRN 40
PRN 41	PRN 42	PRN 43	PRN 44	PRN 45
PRN 46	PRN 47	PRN 48	PRN 49	PRN 50
PRN 51	PRN 52	PRN 53	PRN 54	PRN 55
PRN 56	PRN 57	PRN 58	PRN 59	PRN 60
PRN 61	PRN 62	PRN 63	PRN 64	PRN 65
PRN 66	PRN 67	PRN 68	PRN 69	PRN 70
PRN 71	PRN 72	PRN 73	PRN 74	PRN 75
PRN 76	PRN 77	PRN 78	PRN 79	PRN 80
PRN 81	PRN 82	PRN 83	PRN 84	PRN 85
PRN 86	PRN 87	PRN 88	PRN 89	PRN 90
PRN 91	PRN 92	PRN 93	PRN 94	PRN 95
PRN 96	PRN 97	PRN 98	PRN 99	PRN 100

(Print 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100)

Figure 1: Dragon printer carriage forms - solid numbered pins are on the top row with pin 1 on the right.

PRN 1	PRN 2	PRN 3	PRN 4	PRN 5
PRN 6	PRN 7	PRN 8	PRN 9	PRN 10
PRN 11	PRN 12	PRN 13	PRN 14	PRN 15
PRN 16	PRN 17	PRN 18	PRN 19	PRN 20
PRN 21	PRN 22	PRN 23	PRN 24	PRN 25
PRN 26	PRN 27	PRN 28	PRN 29	PRN 30
PRN 31	PRN 32	PRN 33	PRN 34	PRN 35
PRN 36	PRN 37	PRN 38	PRN 39	PRN 40
PRN 41	PRN 42	PRN 43	PRN 44	PRN 45
PRN 46	PRN 47	PRN 48	PRN 49	PRN 50
PRN 51	PRN 52	PRN 53	PRN 54	PRN 55
PRN 56	PRN 57	PRN 58	PRN 59	PRN 60
PRN 61	PRN 62	PRN 63	PRN 64	PRN 65
PRN 66	PRN 67	PRN 68	PRN 69	PRN 70
PRN 71	PRN 72	PRN 73	PRN 74	PRN 75
PRN 76	PRN 77	PRN 78	PRN 79	PRN 80
PRN 81	PRN 82	PRN 83	PRN 84	PRN 85
PRN 86	PRN 87	PRN 88	PRN 89	PRN 90
PRN 91	PRN 92	PRN 93	PRN 94	PRN 95
PRN 96	PRN 97	PRN 98	PRN 99	PRN 100

(Print 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100)

Figure 2: Cartridge connection for 28-way Amphenol plug.



Figure 3: 28-way Amphenol socket showing pin numbering.

This switch is a bit of a nuisance as it enables me to print out work rapidly, to find my many mistakes, then, when corrected, select MUQ for the perfect master without having to remember the appropriate software codes. The ribbon cassette is small and sits on the print head. It contains a seamless ribbon with a claimed life of three million characters in draft mode. So far I have not had to change it and the print quality is fine. By way of comparison the miniature ribbon in my previous machine (Silentec CP80) needed replacement every few months.

There have been no problems with the machine but there are areas in which it could be improved:

1. The near letter quality mode from 0 to 98 to facilitate correct alignment of the paper, but the bar is black and the scale is simply indented on it. This means that it was almost impossible to read until I filled the

indentations with yellow crayon.

2. A smoked plastic cover is fitted when a careless driver would make the print easier to read.

3. The method of switching the printer Off-line from software is not totally satisfactory. Switching back to On-line requires another software code as opposed to using the switch on the machine.

An audible device to indicate when a page was complete would be useful.

The printer is capable of proportional spacing, auto right justification, has 32 international characters, vertical and horizontal tabulation and the ability to store 48 of your own characters. Overall the machine has been superb and I have no hesitation in recommending it particularly now that it can be purchased for around £180.

Mike Aldon

Price around £180

## Silentec DX-88

My very first computer, bought in early 1983, was an Oric, which, alas, proved to be no Oracle. At the same time I bought a Silentec CP100A printer which I then thought was marvellous, having little idea of what a true daisywheel (which it didn't have) was, or what nice print should look like, how long the ribbon should last (not very long, and expensive) and how much noise one might expect when using it. I was then programming with a more knowledgeable friend and when we discovered that the Oric could not handle data file within a program, I decided that it would have to go and that I would get a real computer, and thus my DRAGON 32 was acquired later that year.

By the autumn of 1985 I had acquired a label printer to maintain a small club file and found that the Silentec was very resistant to feed the rather heavy label stationary unless one helped it along by pulling the stuff through at the top end. You can imagine that the results from this were rather uneven and I came to the conclusion that the Silentec would also have to go, or so the Americans say when they feel somebody "be outplayed".

Then I came across an advert in Business Computing for the Silentec range of printers, made in Wiltshire with only three imported parts, which offered quite a lot of features including plug-in interface cartridges for connection to a whole variety of popular home computers as well as business machines such as the IBM PC, for just over £200 including VAT. This was the DX-88, but I chose the next model up, the DX-89, for £45 more, because it could print Near Letter Quality (NLQ) on an 18 by 18 matrix instead of the 9 by 9 printing held standard on the DX-88.

I ordered it direct from the factory, which at the time gave me a discount, and it was sent, well packed in polystyrene and carton, by Tupper Express, for a minimal delivery charge of around £10. This was well worth it as it arrived in excellent order within 24 hours of dispatch.

Inside was an 81 page typescript instruction book, which tells you first about

servicing the label clamp which holds the head and some foam packing which protects the carriage assembly. You then mount the separately packed ribbon drive plate and the ribbon cartridge. Spares of the latter are obtainable from the factory are about half the price of the Silentec ribbon, last about ten times as long and furthermore are also similar to a very readily available Mannesmann Italy 1000 ribbon. You then connect the Centronics parallel interface cartridge to the back of the machine and into this in turn goes a standard Dragon printer cable previously obtained from one of the advertisers in Dragon User. The mains cable and switch is just above the cartridge and on the front of the printer are switches for line feed, auto down, form feed, and on/off line (to the computer) complete with a small on-line indicator lamp. Three more indicator lamps show power on, hardware error and paper end, which also sounds a buzzer.

It is of course an 80 column machine which has a typewriter-like full-width rubber roller with hand wheel which takes single sheets of stationary which are held in place with a set of small pinch rollers actuated by a lever on the right. The same lever shifts the open position when using standard 11 pin continuous perforated fan-fold paper which is fed by a pair of adjustable pin feed wheels with finger clamps each side of the paper roller, allowing about one inch of width variation.

You can then use a self-test program of the character set by switching power on and depressing the line feed button at the same time. This was satisfactory and after loading one of my programs, the next step was to do a printout with a LUNAR command. It did a very crisp clean run at 100 gpm in draft mode with the head printing in both directions, really very quiet, as the inside of the casing is partially lined with sound absorbing sponge rubber and the machine could not be heard in the next room. There is a gentle rocking motion when the head moves. Furthermore a blank 1 inch slipover is available each side of the paper feed perforation, leaving a nice neat appearance.

This last feature as well as many others

controlled by a series of 14 double-throw flip switches which are found at the front of the unit raising the cover. Probably the first thing to set up is the front length of your paper. The lever is the usual, but it can be changed to 12in./18in. or 14in. The third thing is the international character set. US-ASCII for the U.S. flag, or US-ASCII for "local" which looks better in program listings. You can also use French, German, Danish, Swedish, Italian, Spanish and, yes, even Japanese as well as IBM character sets.

Feed composites of typeface: Pica at 10 per inch (80 columns), Elite at 12 per inch (96 columns) and Condensed at 17 per inch (136 columns), as well as emphasized in Pica. You can change line feeds and carriage returns, print your zets with or without a slash and switch when everything is printed over a second time and the speed drops to 25 cps. All the switch changes are installed by turning the power off and then on again after a few seconds.

Your print-outs in a data file will look much better if the headings are done in bold double letters and for those of you who are new to printing here is an example how this is done:

RODMONTE-D. CHEN (14) The Normandy

The first part opens the file to the printer and the second turns on double-width for that line only. There are other CHRP commands for continuous use and for returning to normal size letters. These control codes can be implemented in ASCII, DEC, or HEX, and are set out in the instruction book, together with all the other software commands which can be used instead of the clip-artiles described above. In addition, you can have underlining, superscript or subscript, emphasized or enhanced



letters, normal, dual or quad density graphics, although I have not explored those yet.

One of the things I wanted to use the printer for was my Dragon *Superwriter* II word processor cartridge (unfortunately no longer available) (as this can use any column screen size). This lets you set on the screen what you get on the paper without scrolling sideways and works well with the *Chippinall* type font. By using the *Superwriter* II and the printer manuals it is not too difficult to set up printer driver codes in BASIC to call up features such as the different type faces, underlining or double size letters. They are then readily available by pressing only the CLEAR key followed by a single figure and can be saved on tape together with your letterhead software. I might mention a few comments.

This is handled very efficiently with the skip-oval feature switched off. The stationary pulia through with ease and prints a nice clear label in 60 second time.

While the DR-80 may not be the very cheapest printer on the market, it is solidly made and has very competitive features, making it my best buy; the cheaper DR-60 must also be considered to be very good value for many Dragon enthusiasts.

**Figure 1**

**L'azienda ha un sistema di gestione della qualità certificato ISO 9001**

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

WITH EIGHTS firmly fixed on my GUN (Great Unfinished Novel) a printer was high on my list of priorities back in 1984. (But what have I read?)

I needed a reasonably good quality print-out and the ability to print in large quantities onto A4 paper. Daisywheel printers offered excellent quality, but were too expensive and too slow for my needs. A dot matrix printer seemed to be the answer, but I was not very impressed with the print quality of the machines, which I observed out.

Some were better than others, but somehow they all managed to look as if they drilled words into the page — rather like that old advert spelling out the name *Wine* in its last letters.

All that is, but one. When I discovered the Chinese CP80 I knew my search was over. This was a dot matrix printer with one special attribute — no dots!

Thompson is disappointed that on the Chinese (CNS) and Chinese, and (CNS), as a result.

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while the characters it outputs are slightly thicker than other dot matrix printers they are very nice letter quality and are certainly less eye-straining than the "poppered" ones of many dot matrix printers.

I will come to the technical details in a moment, but let me deal first with the most important question, next to the price, for a potential buyer — just how reliable has the Bionics OP&O proved to be over the past three years?

Let me put it this way: in these three years, my machine has produced ten copies of a 50,000-word book. That's around five million characters and doesn't take into account a wealth of letters, articles, and e-mails.

With one hiccup it has done all that have demanded of it and is going as strong as ever. The hiccup came when the printer ran seven months old. One of the eight rolls in the reel had jammed.

To make matters worse, the company from which I had bought it, SCS&L, had just gone out of business. I contacted another Chinese supplier who put me in touch with Micro Peripherals of Basingstoke, who are the UK agent for RiscSys. They bought

The guidelines which had come with the  
musician.

Not only that, they also replaced the print head and had the printer winging its way back to nearby return of post. How's that for news, huh?

Modelled for turn-of-the-technical-side. The Grimes CP80 measures 375mm x 260mm x 125mm (deep) and weighs 8.3kg (18lb). The standard model has both friction and tractor feed which means it can take sheets of hygienic paper or continuous fanfold paper with perforated edges.

The machine is also supplied with a paper guide wire rack which helps to keep the inside and the outside paper apart.

The interface is standard Centronics parallel which means that it can be connected directly to the Dragon without difficulty via the printer port, although there is an optional RS232C serial interface available for other micros.

Plugging the printer into the Dragon port and into the main supply is virtually all that needs to be done to prepare it for action, although you will need some sort of program in your Dragon to tell it what to print.

The printing speed is 80 characters per second which means it takes about 90 seconds to print an A4 sheet. The character set is printed on a 7 by 8 dot matrix and consists of 256 ASCII characters, normal and bold alpha-numerics, fonts, symbols and some graphics.

The normal dot density is 640 per line although compressed format is available providing 1280 dots per line. Subscript, superscript and underlining are all supported.

Column width in normal mode is 88 (although this can be doubled to 140 columns or compressed to 142). Compressed double width produces a 71 column display and routines can be mixed on one line.

Printed options include a choice between a simplified read and a user without a simpli read and a user without a simpli read and a user without a simpli read.

The Shimes CP60, like most other dot-matrix printers, can also be used to produce a hard copy of the graphics screen by printing rows of eight pixels at a time. The manual accompanying the printer is adequate, but suffers occasionally from heavy-handed translation from Japanese. (I still haven't figured out what it means by the word "superficial".)

The example programs in the printer handbook use ESC/ape codes with the `LPPRINT` instruction (use `PPRINT` with the Oregon) and are all in BASIC, which is a pity since a machine code routine or two would have been nice for those of us who like our graphics to be as speedy as handcopy before our crosses reach solid.

In the September 1988 edition of *Dragon* User Info-ug, Dwyer had a machine-code program to do just that. It is reproduced in listing one. The jump is executed with the instruction `JPBC 0, HTRC0`.

[illegible]

“中国书画函授大学肇庆分校”于1983年经教育部批准成立，是肇庆地区唯一的一所成人高等教育机构。学校设有文学、艺术、教育、理工、农医等10多个专业，面向全国招生。建校以来，为社会培养了大批专业人才，为肇庆地区的经济建设和文化事业做出了重要贡献。

Back of the manual contains a wealth of detail about control codes, configuring the printer and using the bit image mode. But user-friendly it ain't!

However, the Shione uses Epson-type control codes, so it may be possible to find a more friendly Epson manual to answer those questions which the Shione's hand-book doesn't.

At the side of the printer is an on/off switch and a small keyboard in the right-hand bottom corner has three switches and four LED displays.

On power up one of the L&R's lights up, but the printer will not accept data until its 'On-Line' switch is pressed. When it is pressed, two more of the lights come on, indicating that the printer is on line and the other that it is ready to accept data.

The North LED indicates when the battery is near the end.

One of the remaining two switches advances the paper to the next top of form position and the other advances the paper to the line.

Line feed is usually controlled by the

800 characters per second, but I would estimate it to be nearer 60. This printer will accept either single sheet or tractor feed continuous form stationery. When the paper is depleted, a warning buzzer sounds for 5 seconds, printing stops, the printer goes off-line to ensure that no text is lost and the paper cut light comes on. After reloading the paper, printing may be resumed by taking the printer on-line again.

Inside the unit are two sockets marked 'RAM' and 'MAIO'. These may be fitted with 2 x 64K static RAM chips to provide a 96K or 48K buffer. At under two pounds each, these are a worthwhile investment, and are a necessity if you plan to down-load an alternative character set if you can device one the printer doesn't already have.

The ribbon used is a nylon backed multi-strike curtain, cartridge type. They cost about £5 and are readily available, since the Commodore MPS 800 uses them. They also last a long time — I have had my printer for one and a half years and it'm-only my second ribbon in this time. I have experienced no problems at all, unsurprisingly the standard Dragon machine, Plus, C64, or even a BBC Master (aptly), I would even dare to say that the CDP4 is built even better than an Epson.

In summary, this is my best and most reliable peripheral. I wonder how I ever managed without it.

S.J. Taylor

Look for price around £200 or less.

#### Tandy CDP Printer/Plotter

Time, Tandy Corporation sells a variety of computer equipment and as one of its computers is very similar to the Dragon, some of its equipment is of interest to Dragon owners. I bought from Tandy a CDP 115 Plotter some 18 months ago and I have been very pleased with it.

At the time I was hoping to buy a test printer, but the only ones available in my town were cheap and nasty or were much too expensive for hobby purposes.

Although the CDP 115 is primarily a plotter, it can print text quite nicely and it was reasonably priced. I had some doubts initially, but the business manager told me that Tandy allows a 30-day trial of its computer equipment. So I took it home to see if I liked it. Long before the end of the period, I decided that it would fulfil my requirements.

The list price is now £295, but most of the time the machine is on 'offer' at £495 and this is what I paid. However, I also had to buy a ribbon cable at £19.95 to connect it to the parallel port of my Dragon 64. Although I haven't tried it, it ought to be possible to connect to the serial port since the printer can work with one. The printer works with the built-in driver at Dragon 64 and with the normal PRINT1300 at Plus.

There are no installation problems. Four CDP switches have to be set, but this is explained clearly in the manual. There has never been any need for maintenance. If I had to buy a printer tomorrow, I would either buy the same again, or else adopt a quite different approach, namely to buy the PC conversion disc from Commodore so

#### CDP-115 DEMO

##### COLOUR GRAPHIC PRINTER

-----CIRCLE-----



```
10 REM*****
20 REM CDP-115 DEMO EX PARALL
30 REM*****
40 TXT4=CHR$(17):GRF4=(HR$(19)
45 R =100: I RNDIUS
50 PRINT#2,GRF4:PRINT#2,"24" HP:PRINT#2
,"CG" I GRAPHICS:SET SIZE=COLOUR
60 PRINT#2,CHR$(133):CARRIER RETURN
70 PRINT#2,"LB" HP:PRINT#2,"PB,-50":BLAN
K PAGE
80 PRINT#2,"IF CDP-115 DEMO":PRINT#2,"
S I"
90 PRINT#2,"PB,-20"
95 PRINT#2,TXT4+TEXT PAGE
100 PRINT#2,CHR$(20):" COLOUR:CHR$(25
11" GRAPHIC:CHR$(28):" PRINTER" I TEXT
12 I COLOURS
115 PRINT#2,CHR$(101):LINE FEED
120 REM ANAPLOT CIRCLE
130 PRINT#2,"-----CIRCLE-----
"
150 FOR J = 1 TO 250:NEXT I:DELAY
160 PRINT#2,GRF4:PB,-110,240,-110"
165 PRINT#2," I"
170 P1 =3.1416 I P2 = 2AP I
180 B4 =" I"
190 FOR K = 0 TO 100 STEP2
200 S = (K/100)AP2
210 X =(INT(181N(163AR): Y =(INT(18516AR)
220 PRINT#2,BA:XT,X":Y:Y:BA+"D"
230 NEXT
240 PRINT#2,"T-250,-240" HP:PRINT#2," I"
260 PRINT#2,TXT4
```

that I could do my printing in the office where I have access to high quality printers.

Now it is time to put my views into perspective. In this world, you have to be very lucky to get value for money. It is unrealistic to expect a £150 pound machine to be in the same class as a machine

costing several times more. So what's the catch? Each to his own opinion say I. The principal points to note are:

(a) The CDP 115 prints on paper from a 45 inch wide roll — too bad if you must have A4. The text format is either 40 characters per line at a spacing of 10mm between lines, or 80 characters at a spacing of 20mm.



(a) It writes rather than prints with retracts as ball-point pens. The pens move from side to side and the paper jiggles up and down. The result is that the printing speed is a mere 10 cps which is much slower than a dot matrix printer.

(c) The machine looks like a little fairy. I would not recommend it to anyone who is accident-prone or to anyone who has to do a great deal of printing.

The reader has to judge for herself whether these three points are important.

The 48 character line width is very appropriate to the Dragon's natural 52 character screen with 13 characters that it is appropriate for submission to journals, because editors always ask for wide margins. (Of course down the middle of the page the beautiful photography may be quite suitable. (Printers of this type can give problems with ink-flee, described below, as well as the ink-flee because the result is a blurred which is difficult to photograph or to print.) This is especially a problem with designs, but if the printer is maintained and set up properly the problem does not arise. — Dr. A. features to bear in mind though is that the printed line is very fine (as with a plotter with a claimed resolution of 5.2mm, for fine for normal printing purposes). Of the four colours, blue gives the most legible print and red gives the best contrast for photocopying.

Because the machine is really a plotter it has capabilities that are not usually found on printers. I have not used them in anger but, for the purposes of this review, I have tried all the features and I have a small demonstration program based on a longer one in the manual.

Other features to note are:

(a) In the graphics mode, one can control the print size from 80x4.5 in to 12x4.5 in.

(b) Printing can be from left to right or top to bottom or vice versa if required (eg for the users of graphics).

(c) Underlining and superscripts can be printed.

(d) There are commands to take a line or move the print head relative to a fixed start point, or relatively to present position. The line type can be either full or four degrees of dotted. The colour can be changed by the program. A rather nice compressed three dot axis for graphs, marking the chosen intervals automatically.

The manual is well written. There are some typing and spelling mistakes but only found occasional programming error and it better usually well covered with Tandy's own machine. I mention it only to state a potential Dragon owner from waiting time, if one wants from 'text' to 'graphics' mode, it is necessary to have a pause built into the program immediately before the change. The program in the manual does not give a long enough pause.

To summarize, the DMP-105 is good value for money at the sale price of £495 and merits consideration by anyone who has a modest need for a printer (and who is prepared to accept its relative slowness and narrow paper width).

J. B. Singer

Look for list price £79.95, offer price £49.95.

FOLLOWING many months of searching for a printer to enhance my Dragon, I visited Tandy in Plymouth to look at the printers they had on sale.

I explained to the sales staff what I wanted and they directed me to their computer department. The many printers on display were all connected up to a computer and the sales staff listened to what I wanted, which was 'A printer to print out programs and make readable, neat document drafts'.

The sales staff showed me the performance of about ten printers. The printer that I chose was the Tandy DMP-105. The printer is neat, medium sized and very competitively priced at £120. (Since I bought mine the price has been reduced to just £99.95.)

The DMP-105 has a 18 character per inch print speed of 80 characters per second, bi-directional print, normal, condensed, and compressed characters, graphics character mode.

The DMP-105 operates in two modes: character printing for output of program listings, report writing, or the creation of any text documentation, and a graphics mode for drawing pictures, figures or graphs.

In the character mode the printer prints monospaced 18 dot matrix characters. In the graphics mode you can use graphic data to produce any type of graphic representation you desire.

The printer can use two types of paper, single sheet of any width from 4 in to 9.5 in, and computer fanfold forms with edge guide holes. The printer is capable of producing one 100 page plus-one carbon copy.

The printer is connected to the Dragon via a ribbon cable from the printer I/O port, and has its own power supply lead. Included in the price is the tractor feeder and a small cover that fits to the printer when the feeder is not being used. A paper separator is used with fanfold paper to prevent the fanfold paper from becoming a tangled mess at the rear of the printer.

Connecting the DMP-105 to the Dragon is simplicity itself. Once plugged into the mainboard the ribbon cable connected, the paper is loaded, the power switch turned on and the printer is ready to be used.

On powering up the printer the print head moves from one side of the carriage to the other and then back again. If during this time the ON/UNLOCK LINE button is pressed the printer goes into self-test mode and prints out the full CHR5 set of all its characters available.

The printer has two print function switches (DIP). These are set for parallel or serial connection. Their function is well explained in the manual.

The manual is a very well produced 16 page volume in A4 format. It is extremely well written and easy to understand even by the computer literate (such as me).

Printer modes which are software controlled are: automatic line feed, carriage return; start underline, stop underline; select graphics; start elongation; and elongation; position print head; select

standard character; select condensed character; set carriage return; set carriage return and line feed; select stop; set half forward line feed; start bold and bold; set full forward line feed; select bi-directional printing; select anti-directional printing; return forward line feed; set return forward line feed; repeat print data.

The DMP-105 is designed for two distinct applications, character printing and graphic printing.

The printer responds to software codes from the computer in two different ways — one for each application. The two response patterns, or modes, have many similarities but each has its own unique features.

The character printing mode is used for printing characters. In this mode, line feed commands do not cause immediate printing. Instead, they are stored in the printer's memory along with other data. When the current line is printed, the line feed commands stored in the memory determine the pitch of the paper feed.

Before describing the various print modes available on the DMP-105 it may be worth explaining how the computer interacts with the printer.

All information is passed to the printer in ASCII code. The full list of codes can be found in computer books. Most numbers are printed as letters symbols or numbers. However, the number 8-31, as well as some sequences of numbers are used to control the printer functions. These are known as control codes, some times referred to as Escape codes. These codes allow you to do other things to change the font setting, underline, and select special line feed control.

Graphics mode is very different, as you have complete control over the matrix of dots and also the position of the printer head. The pattern of the matrix is passed to the printer as numerical data numbers from 0 to 255. This allows printing out of high-resolution graphics such as charts, letter heads etc.

The DMP-105 is a dot-addressable printer. Therefore, (a) the maximum left and line length is not determined by the number of characters, but by the number of dots per line. By counting the dot columns, a combination of different dot styles, including standard and elongated, can be printed on each line. The number of addressable dots per line in the Character Printing mode is Normal 80, Compressed 112 and Condensed 160.

If the length of text the printer receives exceeds the limit of dots per line, a linefeed is automatically inserted and the last character is printed from the start of the next line (this is known as wrap-around).

My review of the serial interface may set up, but for those who would like to know about it I am including it for their benefit.

Transmission rate is selected by the two dip switches. The general specification of the serial interface is: Standard: meet with RS-232C serial; baud rate: 600 or 2400 BPS; serial parity: non-parity; buffer: up to 124 characters; data bit: 8 start bit: 1 space bit; stop bit: 1 or 2 mark bits; signal cable: 18 meters max.

interface connector type: 4-pin DIN socket; model: EC6 4444-014 or equivalent; manufacturer: Hosiden Co. Ltd.

In summary then I feel the Tandy DMP-105 is extremely good value for money. The quality of the printed work is very pleasing and would put many printers at almost twice the price to shame. The performance of the printer seems limited

only by the imagination of the operator.

The DMP105 is manufactured for Tandy in Japan. The catalogue number is 26-1276. It is worth noting that the ribbon cable is not supplied with the printer (This is something I can understand, it is like buying a bicycle without a chain). Bando's twenty too much. I asked for a price anything from £20.00 to £35.00, so my advice is to shop around. Tandy do sell the lead.

I have no reservation in recommending this printer to anyone and in fact following visits to my house three of my work colleagues have bought the DMP105. I hope that this article is of some help for those unable to go from shop to shop and I'd like the sales staff into explaining the printer on sale.

Jan Martin  
Look for price £20-25 or a little over.

## JUMPING THROUGH HOOPS

THIS SECTION ILLUSTRATES WHAT THE DMP 105 CAN DO WITH A LITTLE HELP FROM PROGRAM SOFTWARE

```
NORMAL:-      THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS
COMPRESSED:-  THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS
UNCOMP:-      THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS
BOLD          THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS
```

THE LISTED PROGRAM SHOWS HOW ESCAPE CODES MAY BE USED

```
10 PRINT#2, CHR$(27)+CHR$(14)+";      JUMPING THROUGH HOOPS"
20 PRINT#2, CHR$(13)
30 PRINT#2, CHR$(27)+CHR$(15)+";      THIS SECTION ILLUSTRATES WHAT THE DMP
40 PRINT#2, CHR$(13)                      FROM PROGRAM SOFTWARE"
50 REM"
60 AB="THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS"
70 REM"NORMAL:-      " + CHR$(27)+CHR$(15)+";      " + CHR$(27)+CHR$(15)+";      "
80 PRINT#2, AB+CHR$(46)
90 PRINT#2, CHR$(13)
100 PRINT#2, CHR$(27)+CHR$(23)+CHR$(46)+CHR$(46)
110 PRINT#2, CHR$(13)
120 PRINT#2, CHR$(27)+CHR$(28)+";      " + CHR$(46)+CHR$(46)
130 PRINT#2, CHR$(27)+CHR$(19)
140 PRINT#2, CHR$(13)
150 PRINT#2, CHR$(27)+CHR$(21)+CHR$(13)+";      BOLD      " + CHR$(46)
160 PRINT#2, CHR$(13)+PRINT#2, CHR$(27)+CHR$(32)
```

```
10 "THIS IS A SHORT PROGRAM TO ILLUSTRATE THE SCREEN GRAPHIC DMP"
20 " IT IS NOT THE MOST ELEGANT SOLUTION TO THE PROBLEM BUT IT DOES WORK."
100 MODE 3: SCREEN 1: MFCOLS 1
110 FOR R=10 TO 90
120 FOR S=0 TO 1 STEP .5
130 FOR C=0 TO 4 STEP .2
140 CIRCLE (120+.75*R+.5*C, 1+.5*C+.5*.5*C+.5*.5*C)
150 NEXT C
160 NEXT S
170 NEXT R
180 SOUND 12,100
190 AB=PREY:IF AB="P" THEN GOTO ELSE 190
200 X=0:Y=0
210 FOR Y=0 TO 191 STEP 1
220 FOR X=0 TO 255
230 A=ABS(PPROINT(X,Y))-1+1+ABS(PPROINT(X,Y+1))-1+2+ABS(PPROINT(X,Y+2))-1+4+ABS(PPROINT(X,Y+3))-1+8+ABS(PPROINT(X,Y+4))-1+16+ABS(PPROINT(X,Y+5))-1+32+ABS(PPROINT(X,Y+6))-1+64
240 IF A>127 THEN A=0
250 P=A+128
260 PRINT#2, CHR$(13)
270 PRINT#2, CHR$(13)
```

# Expert's Arcade Arena

Write to "The Expert" at Dragon User  
12-13 Little Newport St, London WC2H 9PP.  
with all your arcade tips and hints.

**GOOD AFTERNOON**, or morning, or whatever time it is that you're reading this. If you could all raise your glasses please, the toast is Joe Blinnel who has managed to map out the whole of *Star Blazer Universe*. The task of finishing unseen areas is certainly mammoth, the task of mapping the universe is even more mammoth, and the task of presenting it neatly and clearly is pure Joe Blinnel. (He's printed it as large as we can, but you may have to use your imagination with some of the names — Ed.) Good luck with Universe Test, Joe.

Now then, a lesson for you all about the way to address me within your correspondence. The example for you comes from M. Hall, the start "Paul Highness" — This is a good start — "I am having some problems understanding how to use some of the **POKEYS** you have most graciously supplied in your noble column. I have had complete success with the likes of *Shack Nipper*, but *Star Blazer Universe* is a mystery to me. What use is the **RESET** Poke, when program's **LIVES** address what should be **Player's**? Can you furnish me with details on how to cheat more efficiently?"

"I offer humble thanks for your valuable time and think that the column is the best thing since the Pan-Galactic Gargle Bliner."

Now then, this is how to write a letter. Well done, M., by the way, who stole the text of your first name? The answer to your questions are that a **RESET** Poke stops the machine from cold starting when you push

the button on the side of the machine. The **LIVES** address should be poked with the number within set limits, which, if unspecified, are 0255.

Now then, to come back to Joe's map printed in on the center pages, the following points should be kept in mind when using it.

- 1) The map shows version 1.3. Other versions may be different.
- 2) There is a **slingshot** down from gallery 9 to 8, so collect as many credits as possible before going over to gallery 8.
- 3) If you try to go through the **Black Hole** in gallery 11 you must have obtained a shard, otherwise you will disintegrate.

Now then, to *Shack Nipper*. And also to a name that has been never before seen in this column. Yes, this is a name "P-R-E-M-I-E-R-E", came on down R. A. Coats (here, another one who's had his first name poked), maybe there's a case here for the great detective *Shack Nipper*, who provides a way to beat the computer opponent every time on *Shack Nipper Plus*, it runs thus...

**BOOTS 1 & 2:** As soon as you have been given the instruction to light put the joystick in the top left position to do a forward somersault to meet the computer opponent in the middle of the screen. Keeping the joystick where it is, press the fire button. Your man should now do a high back kick to kill your computer opponent. You should get 500 points for this every time

you do it on foot one and 800 on foot two.

**BOOTS 3:** On the second light put the joystick in the top left position. During the second forward somersault put the joystick in the middle right position. Your opponent should then back somersault to land in front of you. When he lands press the fire button, this should give you 400 points.

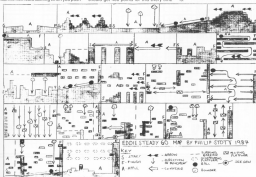
**BOOTS 4:** Put the joystick in the bottom left position and hold. When the computer opponent somersaults toward you put the joystick into top right position. Everytime the computer opponent lands, press the fire button (this one will take a lot of time and practice to perfect).

**BOOTS 5:** Repeat method for foot 3, but put the joystick in the top position and hold down the fire button. This should drop kick the opponent for 1000 points.

Right, that's that, now then how about some major game solutions from you? By the way, what do you think of Philip Stott's *Steady Go Map*, pretty good eh?

Here's a nice little routine from Paul Bargin for *Incentive's Moon Crests*. Load up using **SRPF**: **POKE 1265:POKE 1270:EXEC 4684:204,1,2,142,96,98,137,120,234,32,6**. Finally start the program with **EXEC 826**. This should make your small ship insubmersible.

That's it for this month but next month sees the publication of edited highlights of Paul Bargin's *Hacking* sheets for which I send him my thanks and, yet, my admiration, and if that isn't a world first nothing is.







# An Epson, not an Epson

B. Yeoman Walker on printer codes, with a program to print out Star DP510 type styles

THE trouble with this article is that it falls between two stools. It was prompted in the first place by the ever helpful Pam D'Arcy's article in the February 1987 Dragon User. She made three major points: (1) Epson control codes have long been the "standard" for the dot-matrix printer industry; (2) The control codes involving several CnHh(X) statements for each, are extremely tedious to use, particularly when several different codes have to be sent before printing can commence, or to alter something during printing. She offered a neat method of converting codes to string variables resulting in considerable simplification in the control of the printer. (3) Tied in with the latter she offered a program for printing cassette labels which would greatly ease the labour involved.

Taking these three points in turn: (1) Unfortunately she did not mention which model Epson she was using, and the control which I am aware has codes which are noticeably different from the codes she gives. So here must be at least two Epson "standards". Now it so happens that I don't have an Epson, but I do have a manual for the Epson-M880 Type III; M880HT Type III, which shows in particular that there are no ESC- "H" codes, and so Pam D'Arcy's program would not work as it stands with one of these machines. (2) I am a little bit about the tedious nature of the ESC codes touched a sensitive nerve, as they are SO tedious that I had never investigated more than a few on my Star DP510. So here was the opportunity to do something about it. (3) Though labelling was not of immediate interest, I had long felt the need for a program that would print comparable examples of the same five words in ALL the type styles available, to assist in deciding which particular style is best suited to say the headline on a form or the title for an article. The program would have to be structured somewhat differently from Pam D'Arcy's label printer.

I came to own the Epson manual in interesting circumstances. The manual that came with my Star DP510 Printer unfortunately gives the codes only in their ESC format (ESC W t) for enlarged mode), but no indication of how to achieve them, and for several weeks I was virtually stuck. During a conversation with a friend, who has not got a Dragon but who has got an Epson printer, he kindly produced his Epson manual which showed exactly how the codes are put in. Most of the codes (but not all) were identical to those of my Star, and as the manual was tending to fall apart from the binding he graciously agreed to buy a new one and sell me the old.

I learned from this Epson manual, for example, that the above code was typed in as CHHh27CHHh28CHHh29. Note that the first two sets of brackets contain the ASCII equivalent of ESC and W

## PRINTER CONTROL CODES

Figure 1

FOR STAR MODEL DP510		
Other Epson Models: M880 Type III & M880HT Type III use Postscript		
ESC VERSION	DECIMAL VERSION	
MAIN PRINT CODES		
ESC P 1	Normal (Pitch 80 cols/line)	27 80 1
ESC P 2	Wide (Pitch 112 cols/line)	27 80 2
ESC P 3	Condensed (Pitch 56 cols/line)	27 80 3
ESC W 1	Enlarged On	27 87 1
ESC W 0	" Off	27 87 0
ESC 4	Double On	27 82
ESC 5	" Off	27 83
ESC - 1	Underline On	27 45 1
ESC - 0	" Off	27 45 0
ESC 6 0	Superscript On	27 83 0
ESC 6 1	Subscript On	27 83 1
ESC T	Super/Subscript Off	27 84
ESC 8	Initialize Printer	27 84
PRINT MODIFYING CODES		
ESC 6	Emphasize On	27 87
ESC F	" Off	27 70
ESC G	Double Width On	27 71
ESC H	" Off	27 72
ESC Y 1	Zero with slash	27 86 1
ESC Y 0	Zero without slash	27 86 0
INTERNATIONAL CHARACTER SETS		
ESC R 0	U.S.A.	27 82 0
ESC R 1	French	27 82 1
ESC R 2	German	27 82 2
ESC R 3	U.K.	27 82 3
ESC R 4	Danish	27 82 4
ESC R 5	Swedish	27 82 5
ESC R 6	Italian	27 82 6
ESC R 7	Spanish	27 82 7
ESC R 8	Japanese	27 82 8
PAGE MODIFYING CODES		
ESC 0	Line Space 1/8th "	27 48
ESC 1	" " 1/4 "	27 49
ESC 2	" " 1/2 "	27 50
ESC 3 n	" " n/144 "	27 51 n
ESC 0 n	" " n/72 "	27 48 n
ESC 3 n	" " n/144 " See Line only	27 74 n
ESC 7 n	Header Line Set to n mm lab	27 55 n
ESC 8 n n n n MUL	Vertical Tab Set	27 66 n n n n MUL
ESC D n n n n MUL	Horizontal Tab Set	27 68 n n n n MUL
ESC 8	Page Cut, disregard	27 56
ESC -	" " reset	27 57
ESC M n	Perforation Skip On	27 49 n
ESC 0	" " Off	27 50
ESC C n	Form Length in lines, 1-127	27 67 n
ESC C 0 n	Page Length in "	27 67 0 n
ESC P n	Left Margin in cols, max 127	27 77 n
ESC 0 n	Right Margin in cols, max 127/LJ	27 81 n

respectively, but the third brackets contain the ACTUAL number 1 and NOT its ASCII equivalent. An alternative form is to replace the middle term CHR\$(25) with "W", but this cannot be done with the first and third terms.

You will notice that the `+` in the Listing has been replaced by `+`. This is because of the use of string variables, which will only accept a `+`. I forgot this until after I had typed in the whole program, and on trying RUN got the dreaded `SYS ERROR`. So had to edit the change to `+` for every one.

My initial reaction to Pam D Army's article was merely to produce a corrected chart and program showing the codes for the Star DPM40 and modifications for the Epson Model's. But as I progressed, the need to examine all the type styles available became more urgent, so I decided to do in a new program to achieve it.

Figure 1 gives all the codes for the STAR DPM40 taken from the Manual and arranged in an order most suited to my purpose. A footnote shows where those of the Epson differ.

Figure 2 is a list of the Test Print options (TP#) used for my program. It has been kept separate from the Listing to avoid clutter (and to save memory). As far as possible I have used the same symbols for the string variables as Pam D Army's for interchangeability, but there are one or two differences. This list is incomplete since I am not currently interested in general printing and for brevity I have omitted all the line feed codes etc., but of course it can easily be expanded by anyone having the need.

In the Listing, the Basic Program is contained in lines up to 240, lines 250-260 set up the Test Print options available; and lines 260-400 contain the FOR NEXT loop that prints the options.

The words to be printed are typed in between the quotes at line 180 in place of YOUR printing TEST. The string variable `PR#` at the end of this line resets the printer back to the original default mode after each printed line. This is very economical, since it saves having to use "cancel" or "off" codes in many lines.

Line 260 assigns the TP# to the number 50 and, if you increase or decrease the number of options then `Dim` should be adjusted accordingly, since the `OPTION` only accepts 10 in default. Pam D Army mentions a "proportional" facility, but this does not appear to be available in either the Star or Epson models under discussion.

So, if you have either of the types of Epson printers (manufactured by Seiko Matsushita Co Ltd) or the Star DPM40, you could adapt any of them to either of these two programs with a little judicious "S&S" style messing (ouch — very Madonna Baw!) You want just a headline enter `str` of a few codes.

Those of you who, like me, have purchased small amounts of software from Pam D Army at Paragonware Ltd., will know from experience how fair and helpful she is, if you haven't then you will just have to take my word for it.

By the way, if you use a Star DPM40 — the codes are NOT all the same...

## Figure 1 continued

### MISCELLANEOUS

ESC U 0	Print Unidirectional On	27 00 1
ESC U 0	" " " Off	27 00 0
ESC P 0	SEL (Buffer) Off	27 09 0
ESC X 0	" " Restore	27 09 1
ESC >	Set Bk. ang	27 02 1
ESC >	Set Bk. ang	27 02 0
ESC C	" " restore to orig. form	27 46
ESC C n1 n2	Col. Span. Bk. Image mode	27 28
ESC L n1 n2	" " " " "	

### MISCELLANEOUS: NON-ESC CODES

NA	Ends Table, 5 positions same ESC	0
CR	Carriage Return, "ENTER"	10
LF	Line Feed	10
VT	Tab	9
FF	Form Feed	12
HT	Horizontal Tab	9
SO	Shift Out/Enlarged Type	14
OR	" " " Cancel	12
OC	" " " "	20
SI	Shift In/Condensed Type	15
SC	" " " Cancel	16
SE	Set Space	127
SEL	Self Buffer's	8
DC1	Printer on line	7
DC2	" " off line	17
ESC	" " " " "	27

"ESC" = "Service Contrast"

### FOOTNOTE

Codes for EPSON Printers Models ROM Type111 and ROM/11 Type 111 appear to be similar to the above with the following exceptions —

## LIST OF TEST-PRINT OPTIONS

Figure 2

TP#(1)	= Normal (Pical)
TP#(2)	= Elite
TP#(3)	= Condensed
TP#(4)	= Enlarged
TP#(5)	= Normal, Italics
TP#(6)	= " " ,Emphasised
TP#(7)	= " " ,Double Strike
TP#(8)	= " " ,Emphasised,Double Strike
TP#(9)	= Elite,Emphasised
TP#(10)	= " " ,Double Strike
TP#(11)	= " " ,Emphasised,Double Strike
TP#(12)	= " " ,Italics
TP#(13)	= Condensed,Emphasised
TP#(14)	= " " ,Double Strike
TP#(15)	= " " ,Emphasised,Double Strike
TP#(16)	= " " ,Italics
TP#(17)	= Enlarged(Normal),Emphasised
TP#(18)	= " " ,Double Strike
TP#(19)	= " " ,Emphasised,Double Strike
TP#(20)	= " " ,Italics
TP#(21)	= Elite,Enlarged
TP#(22)	= " " ,Emphasised
TP#(23)	= " " ,Double Strike

```

TP#(24) = " " ,Emphasized,Double Strike
TP#(25) = " " ,Italics
TP#(26) = Condensed,Enlarged
TP#(27) = " " ,Emphasized
TP#(28) = " " ,Double Strike
TP#(29) = " " ,Emphasized,Double Strike
TP#(30) = " " ,Italics
TP#(31) = Normal,Italics,Emphasized
TP#(32) = " " ,Double Strike
TP#(33) = " " ,Emphasized,Double Strike
TP#(34) = Elite,Italics,Emphasized
TP#(35) = " " ,Double Strike
TP#(36) = " " ,Emphasized,Double Strike
TP#(37) = Condensed,Italics,Emphasized
TP#(38) = " " ,Double Strike
TP#(39) = " " ,Emphasized,Double Strike
TP#(40) = Enlarged,Italics,Emphasized
TP#(41) = " " ,Double Strike
TP#(42) = " " ,Emphasized,Double Strike
TP#(43) = Elite,Enlarged,Italics,Emphasized
TP#(44) = " " ,Double Strike
TP#(45) = " " ,Emphasized,Double Strike
TP#(46) = Condensed,Enlarged,Italics,Emphasized
TP#(47) = " " ,Double Strike
TP#(48) = " " ,Emphasized,Double Strike
TP#(49) = Superscript
TP#(50) = Subscript

```

```

5 *Listing
10 *BASE PROGRAM FOR STAR DPS10 PRINTER
15 *B. YEDMAN WALKER 1987
20 *WITH ACKNOWLEDGEMENTS IN PART TO PAH D'ARCY
25 POLEARIS
30 CLEAR$=000
35 DIM TP#(50)
40 *MISC VALUES
50 AA#=CHR$(3)
60 AB#=CHR$(10)
70 AC#=CHR$(27) 'Escape Character
80 NH#=#$+"P"+AA# 'Normal/Itica?
90 UN#=#$+"P"+CH#(2) 'Elite
100 CH#=#$+"P"+CH#(3) 'Condensed
110 EN#=#$+"N"+AA# 'Enlarged On
120 XN#=#$+"N"+AB# 'Enlarged Off
130 OI#=#$+"I"+ " " 'Italics On
140 XI#=#$+"I"+ " " 'Italics Off
150 OS#=#$+"S"+AB# 'Superscript On
160 OSub#=#$+"S"+AB# 'Subscript On
170 XSub#=#$+"T"+ " " 'Super/Sub/Script Off
180 OU#=#$+"O"+AA# 'Underline On
190 XU#=#$+"O"+AB# 'Underline Off
200 #E#=#$+"E"+ " " 'Emphasized On
210 #E#=#$+"E"+ " " 'Emphasized Off
220 #D#=#$+"D"+ " " 'Double Strike On
230 #D#=#$+"D"+ " " 'Double Strike Off
240 IP#=#$+"P"+ " " 'Initialise Printer
250 *International Char. Sets
260 IUS#=#$+"R"+AB# 'U.S.A.
270 IF#=#$+"R"+AA# 'French
280 IG#=#$+"R"+CH#(2) 'German
290 IE#=#$+"R"+CH#(3) 'English
300 ID#=#$+"R"+CH#(4) 'Danish

```

continued on page 26



# Moving programs

Mike Hides moves machine-code without taking a peak

HAVING a disc drive is great, no more long waits and the dreaded NO EFFORT (now a thing of the past). But I often have need to move programs from one disc to another. This is easy with Basic programs, but with machine code programs, typing in the PEERs tested on the START, END and EX-EC addresses soon becomes an unwelcome chore. This utility resides at the top of memory and, after loading a ROM file, will display the necessary address details by entering C00C0000. Using an assembler the program can be placed anywhere in memory. Listing one shows the program as entered using the ALLDREAd assembler. Listing two allows you to PEEK the information directly into memory.

## How the program works

After a machine code program is loaded from a disc, the Start address is stored in memory locations 652 and 653 (hex), the program length at 654 and 655 and Exec address at 656 and 657.

By PEEKing each pair of memory locations and doing a little arithmetic, the addresses can be arrived at.

For example PRINT PEEKJAHMB;790+PEEKJAH652 will produce the START address. The lower address of each pair stores the hi-byte and the higher address the lo-byte. The program uses the X register to store these memory locations (line 40) and is incremented by 444 in line 390 after each is accessed.

Line 50 uses a ROM routine to clear the screen after which lines 60 and 70 position the cursor on the test screen by loading the value into the X register and storing it at memory locations 68 and 69 (hex). This

value can be anywhere between 1024 and 1535. This is repeated throughout the program to control the position of output on the test screen. The program then jumps to the subroutine LOOP (line 340) which starts by printing the line of text on the screen. This uses a useful ROM routine located at 8065 (hex) which prints from the address one after that in the X register until a zero-byte is found. The program is then sent twice to the

START subroutine before returning for a new line of test.

To obtain the value of the start address use is made of the fact that 4 bit binary numbers can easily be split into 2-digit hexadecimal numbers.

In writing this utility the book by Speed and Samerville, Inside the Oregon has been invaluable. It is an excellent source of ideas and useful subroutines.

## Example

If memory location 652 (hex) holds 10100001 and location 653 (hex) holds 11001000 then these can be combined as follows:

10100001 is A1 (1010 = A and 0001 = 1)  
11001000 is C4 (1100 = C and 0100 = 4)

This gives the Start Address of 01A1C4.

To achieve this the binary number has to be split into two halves and each half converted into hexadecimal. Line 320 saves the value of the X register while the first part of this task is completed. The LSR#4 mnemonic means Logical Shift Right so if register A contained 10100000 (160 decimal) this would change in four steps as follows:

10100000  
LSR#4 01010000  
LSR#4 00101000  
LSR#4 00010100

LSR#4 00001000 the value is now 10 decimal or A hexadecimal. This is now sent to the G2GOUT subroutine which prints the character A on the screen. Line

380 restores the value in register A to 161 decimal which is sent to the G2GOUT routine. This routine first performs a logical AND (line 420) with the value in register A which has the effect of masking off bits 4 to 7, so if register A contained 10100001:

10100001  
00001111

the result of AND# BF is 00000001 (1 decimal)

This is sent to the G2GOUT routine which prints the character '1' on the screen. Thus the screen now gives the information:

START 01A1C4

The memory location 653 (hex) is examined and the appropriate characters printed on the screen. Using the values previously mentioned the screen now displays:

START 01A1C4  
LENGTH 01A00F

EXEC 01A1F5

Finally lines 180 and 190 set the position of the cursor to a convenient place and line 200 returns the control to Basic.

Listing 1			180	LDE	#POS+64	
10		ORG	32640	110	STX	000
20		PUT	04E21	120	LDE	#LINE2-1
30	POS	000	130	JSR	LOOP	
40		LDY	#052	140	LDE	#POS+128
50		JSR	08A77	150	STX	000
60		LDE	#POS	160	LDE	#LINE3-1
70		STX	000	170	JSR	LOOP
80		LDE	#LINE-1	180	LDE	#POS+192
90		JSR	LOOP	190	STX	000

```

200             RTS
210 LINE1 PCC      /START 4H/,0
220 LINE2 PCC      /LENGTH 4H/,0
230 LINE3 PCC      /EXEC 4H/,0

240         LOOP   JBR      @90E5
250             LDR      #1
260         TWICE   JBR      @1707
270             LDRX     1,X
280             CMPE     #3
290             BNE      TWICE
300             RTS
310         BITOUT  LDA      ,Y+
320             PSWS     A
330             LSRA
340             LSRA
350             LSRA
360             LSRA
370             BSR      @1707
380             LDA      @,8
390             BSR      @1707
400             PULS     A,PC
410             RTS
420         DIGOUT  ANDA     @0F
430             CMPE     #9
440             BLS      @1707
450             ADDA     #7
460         @1707   ADDA     #10
470             JBR      @9054A
480             RTS

```

# Listing 2-BASIC loader program

```

10 CLEAR 200,32555
20 FOR N = 32600 TO 32723
30 READ A#
40 POKE N,VAL("&H"+A#)
50 NEXT N
60 DATA 10,8E,06,52,BD,8A,77,8E
70 DATA 04,21,7F,88,8E,7F,85,BD
80 DATA 7F,A4,8E,04,41,7F,88,8E
90 DATA 7F,8F,BD,7F,A4,8E,84,A1
100 DATA 7F,88,8E,7F,7F,BD,7F,A4
110 DATA 8E,84,E1,7F,88,7F,53,54
120 DATA 41,52,54,20,20,26,48,00
130 DATA 4C,45,4E,47,54,48,20,26
140 DATA 48,00,45,58,45,43,20,20
150 DATA 20,26,48,00,BD,50,E5,8E
160 DATA 00,81,BD,7F,85,30,01,8C
170 DATA 00,83,26,F6,7F,A6,A0,34
180 DATA 02,44,44,44,44,BD,07,A6
190 DATA 84,BD,03,15,82,7F,84,0F
200 DATA 81,09,33,82,8E,87,8E,26
210 DATA BD,85,4A,19

```

To save SAVE"NAME",32600,  
32723,32600

To initiate the program  
use EXEC32600.

If you've got a technical question write to Brian Cudge.  
Please do not send a SASE as Brian cannot guarantee to  
answer individual inquiries.

## Dragon Answers

### M-code auto run

I HAVE used your auto-run routine to  
auto-run Basic programs on my  
Dragon. However, these numbers of  
machine code programs, mostly  
generated by my program, which  
I would like to convert to assembly if  
possible. Could you supply an 'idea's  
guide' to the main problems to do  
that?

Mr. T. Ayler  
48 West Road  
Clonmel  
Co. WI. IRL

THE 'quick and dirty' method of  
assembling machine code pro-  
grams is to use the procedures  
below:

1. Type in POKE 25,6:POKE  
1024,1024 and press RETURN.
2. Type in the following Basic pro-  
gram exactly as listed:  
10 DIM A(1000):A=0:GOTO 100  
20 INPUT "ENTER NO. TO LOAD:"  
30 GOTO 100  
100 FOR I=1 TO 1000:POKE  
1024,I:POKE 1024, I:GOTO 100



3. Press PLAY/REC and RUN this  
program.
4. When 'LOADING' starts orange  
press the reset button.
5. Load your machine code program  
(that don't run it).
6. Save the program on the tape  
immediately after the loader has  
saved - i.e. 'CONTIN. BASIC'.  
Start, end, only.

When you want to adjust the game  
just 'CLEAR' memory.

### Hunt the pixel

At the moment am writing about col-  
our screen display for the Tandy  
CSP 175 printer. I have set up a loop  
using the A register to hold the  
horizontal position (from 0 to 255)  
and the B register to hold the vertical  
position (from 0 to 15). My problem  
is that I need to find the colour of an  
individual pixel horizontally & vertically.

R. Marlow  
30 Lorne Avenue  
Bendy, Walsby  
W. Midlands

The routine listed below is based on  
the ROM's 'POINT' function. It will  
return the colour of the pixel at the  
graphics position 'X' (B bit is  
100-199, 'Y' (B bit is 100-199)  
for the current graphics ROM. All of

the graphics variables must be set  
up correctly (this will be done  
automatically by the ROM's 'CON-  
FIG' command before 'EXEC-  
ing' in your routine).

Two ROM routines are used, the  
first adjusts the standard co-  
ordinates to 100-199 and 100-199  
actual co-ordinates for the current  
graphics mode (point 100). The se-  
cond routine calculates the physical  
address in RAM of the byte contain-  
ing the required pixel. The colour of  
the pixel is returned in the 'B'  
register and depends upon the cur-  
rent colour set. After routine info for  
used on the Tandy CoCo (then  
substitute 100 for the first routine,  
and 100 for the second routine  
address).

```

5 'OBSOLETE (BREAK KEY CING INPUT LINES)
- COCO VERSION
10 CLEAR255:32550
20 FOR I=0 TO 25:REPEAT:POKE 32551+I,
VBLANK:WAIT:GOTO 1:GOTO 1
30 DATA 00,77,30,07,01,60,0E,7F,34,0F,
01,30,05,7E,27,01,0A,07,01,34,37,
00,0F,27,01,30,32,62,34,14,60,01,
30,60,01,01,27,0F,01,00,27,04,7E,
01,00,3F,0F,33,10,30,04,34,10,7E,
0F,33
40 EXEC 32551

```

### Renum crash

I HAVE a small program of about 2K,  
written in rdBasic and occupies  
lines 1 to 60 consecutively, and which  
has a large number (4444 approx.)  
of data lines attached to it, starting at  
line 100, making the total memory used  
in excess of 20K. I use POKE  
25,6:1024 to enable this large use of  
data. However, when I track POKE 100,100  
the total program I got a  
990 (65000).

The dos does appear to terminate  
the Basic manual, and nothing could  
be done to stop the program. Could  
you please explain what POKE 100,100  
is and how to avoid it using all the  
available memory.

Alison Burr  
106 Folly Lane  
St. Albans  
Herts

THE reason you cannot find the 60  
ENDROM in your manual is that it is  
not a valid entry. Unfortunately, if you  
use 60,500 on a large program with  
very little free memory it tends to  
crash the computer in a variety of  
ways (such as printing a non-  
existent error message, or clearing  
the screen) and inevitably corrupts  
the Basic program in memory. This  
all happens because ROMRAM uses  
the Basic stack for temporary  
storage (this is held at the top of  
RAM and grows downwards), and so  
all checked that it is enough free  
memory before starting the  
recompiling process.

The only way to get around this  
problem is to free more RAM. For ex-  
ample, delete the first ten lines of  
your program, type in ROMRAM  
100,100,1 and then type back in the  
first ten lines of your program. Alter-  
natively get advised with Dragon  
64 to renumber the program for you  
in 64 mode.

### CoCo break

I HAVE been using your BREAK key  
double routine published in the March  
1986 issue of DLI in most of my Basic  
programs. However, I now want to  
transfer them to the Tandy CoCo  
machine. I use the 'SAVE-PROGRAM'  
method to transfer the Basic, but  
could you please give a CoCo version  
of the double routine?

Alan Angler  
Bristol

THE BREAK key double routine uses  
a couple of ROM routines and this  
is why it does not work on the CoCo.  
The version listed below is an  
assembled one which will work with  
the Tandy machines.

```

5 'BASIC ROM DOUBLE KEY BREAK KEY
6 'PROGRAM 64,77,100,100,1:GOTO 100
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
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27
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74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

```

### ROM swap

I HAVE a Dragon 64 with DragonROM  
and have recently acquired a copy of  
the Tandy CoCo ROM on disc with  
battery life. What I want to know is  
this: would it be possible to load the  
CoCo ROM into the 64 in RAM mode  
and hence fully emulate a CoCo —  
and how?

John Sailer

IT WOULD be quite simple to load  
the Tandy ROM into the Dragon at  
address 30000 in RAM mode and  
hence emulate a CoCo. However, the  
main problem is that the keyboard  
has a different layout on the Dragon  
to the CoCo and hence you would  
need to patch the keyboard routines  
to take account of this (starting at ad-  
dress 10270 in the Tandy ROM).

I should point out that you need  
run the Tandy ROM in direct-run  
mode breaking their copyright on  
that version of Microsoft Basic.

# Winners and Losers

Every month, Gordon Lee will look at some prize programming points from a previous month's competition

HOW MANY prime numbers can you pack into a 6 x 6 grid? This was the essence of February's competition, and one which certainly proved a formidable task. Unlike most of the competitions, there was no 'obvious' solution, the object being to score the highest number of different prime values possible, and judging by the entries received, this was a very hard-run contest, with a difference of only 7 primes separating the top three places.

Table 1 gives the scores and grids of the top six entries received. In the 'grid' column, each competitor's grid is listed across in order. The task itself was not an easy one, and many readers opted for a modified utilising more than one program as an aid to assessing the best strategy to adopt in compiling their final grid.

Basically the task fell into two sections: i) compiling the grid and ii) extending all component values from the grid and testing each for primality.

The first of these takes a number of interesting points. Clearly, as all primes with one digit are digit must end in either 1, 3, 7, or 9, these digits should predominate in the grid. However, using these to the exclusion of the even digits and 5 would be counter productive as only a small percentage of possible primes are composed exclusively of 1s, 3s, 7s, and 9s. Hence, the judicious use of the other digits must be considered. As to how many and where in the grid they should be placed, leads to a near impossible assessment of factors.

## Possible grids

Looking at the task from a purely theoretical point of view, there are 108 possible grids, although this number can be divided by 8 if we eliminate all rotations and reflections of any given grid. Even so, if we considered these grids at the rate of a million per second it would still take 4,000,000,000,000,000,000,000 years to complete the task! Limiting ourselves to mainly to 1s, 3s, 7s, and 9s would still take over 18 million years.

On a more practical level, almost all entrants used the method of 'seeding' the grid with digits and then attempting to improve their score by altering specific digits in turn. In fact, the highest scoring grid was based on the May 1984 competition grid, which, according to Alan Towson of Nottingham wrote to say that he



found the puzzle so challenging that it diverted him from his open university studies. In the course of his endeavours in the competition, *not* CUG, he reports the existence of the prime 199937, which is not only prime in both directions, but also if you drop successive digits off from either end. He ends his letter with the note that he intends to try to find some higher-scoring grids. If Mark, or any other readers find any such grids I will announce the results on a future page in this magazine. Note is my own best score — a grid with 176 primes:

```
32891 982629 94252 93571 75591
005295
```

Once the grid has been filled with the 36 digits, its necessary to split it up into all of the component numbers and to test each for primality. This was an area which tripped up a number of entrants. In fact, quite a number of scores were reported as being higher than those in table 1, but unfortunately they all contained many values which were not

prime, so if you are surprised to find your scores on the list, please re-check your primes. Other competitors included the same prime more than once, and some even cheated themselves by failing to spot primes that were present in their grids. This was clearly the result of failing to 'dissect' their grid completely into its component values. For readers who wish to continue their investigations, in a test grid there 14 six-digit numbers, 32 five-digit numbers, bringing the grand total up to 616. Of course, it is impossible for all of these numbers to be prime. For example, there are only 21 two-digit primes, and 225 positions to fit them in. Available listing the number of primes of varying digit size is given. As an aid to readers who are interested in pursuing the problem further.

This month it has been difficult to be specific about particular points from the programs submitted due to the wide diversity of methods used, but hopefully the general points which were outlined may be of use for future reference.

Table 2

Digits	Primes	Lowest	Highest
1	9	1	7
2	21	11	97
3	143	131	997
4	1051	1039	9973
5	8053	10037	99991
6	68906	100003	999993

Table 1

Competitor	Score	Grid:					
Alan Thomas	168	370049	311833	769193	137677	962743	991391
R. H. Wilson	166	973917	112757	199713	994679	337186	313373
Mark Towson	161	971171	311279	798093	346736	313727	991931
Phil Sapao	139	373311	953995	146173	170937	397181	991523
A. Siddiqui	123	317339	199733	179837	346731	334789	311931
G. R. Barber	122	126719	313739	117431	705793	911999	773779

# Write: ADVENTURE

Peter Gerrard links verb and noun with some action

LAST MONTH we took a brief look at the creation of a simple parser for a Dragon adventure, with the promise that this time around we'd be looking at something a little more sophisticated. However, as several people have mentioned to me, wouldn't it make more sense to concentrate first of all on the vocabulary of the game, rather than the programming around that vocabulary. Which came first, the chicken or the egg, the vocabulary or the parser? Since we seem to be alternating from programming to theory each month, we will revert to theory for this article and take a look at how one might go about building up a large vocabulary for an adventure game. Next month, back to programming again!

## Descriptions and problems

In the parser mentioned last month we concentrated on a simple VERB...NOUN style of command entry, but it's well worth bearing in mind that the finished product will be rather more sophisticated. Sentences like:

Turn the Key in the Door

Put the Book on the Table

and so on, will be understood by the new parser. The verb and noun are fairly obvious (Turn and Door in the first example, Put and Table in the second, but where do the other words come in and how are they understood? A brief diversion.

When the parser accepts a command, from the player, it will first of all remove all occurrences of the words 'the' and 'a', so that (for example) 'turn the key in the door' becomes 'turn key in door'. It will then look for the verb (obviously 'turn' in this case) before starting to go through the rest of the sentence to see what it will look for, but if the player only typed in a verb and a noun, then it will cope with that quite happily. It is the other two words ('key' and 'in') that concern us here.

As you can probably imagine, 'key' could equally well be used as a noun (as in 'find key' for example), but here it is obviously not meant to be a noun, at least not in the old VERB...NOUN scheme of things. It is what I have termed, for want of anything better to call it, a 'linking' word. That is, it helps to link the verb and the noun together.

The word 'in' on the other hand is certainly never meant to be a noun (open the in?), and so falls into a category that I have called 'action' words. That is, a collection of words whose use implies performing an action of some kind. (Should the alien with the phaser' would give us 'shoot' and 'phaser' as the verb and the noun respectively, 'alien' would, in this instance, become the linking word, while 'with' is obviously the action verb.)

Dealing with the latter first of all, action words then can be thought of as words like 'in', 'on', 'under', 'beneath', 'with', and so on. My adventure word probably have more than twenty or twenty five of them, and they could be read into a simple array by doing something like:

```
10 FOR I = 1 TO 10: READ ACTION( I )
100 DATA in, under, on, beneath, next, beside, with, at, below
```

Or something like that. They are, in short, all the words that you can possibly think of that should imply an action of some sort.

The same works for the other all-looking-for a verb, then if one exists) a linking word, followed by (again if one exists) an action word, and finally a noun. If only those words existed (as in climb under table) then the word 'under' is taken to be a linking word. Thus we look for verb...link...action...noun in that order. So, as you can probably guess by now, for every action word there must be a corresponding linking word. Like this, for example:

```
20 FOR I = 1 TO 10: L(I) = ACTION( I )
```

But consider the problem further: We've already seen that link words can also be useless nouns, or vice versa. So, if we have (say) 120 nouns, we would also need a line like:

```
25 FOR I = 1 TO 120: L5(I) = 20 + NOUN( I )
NEXT I
```

assuming that all the nouns were stored in an array NOUN. This then gives us a simple equation. The number of link words will be equal to the number of action words plus the number of nouns.

Having now decided how the action words and the link words are to be made up (the former by choosing the nouns stored, the latter by combining all the action words together with the nouns) how then do we tell our parser verb-based nouns in the first place?

## Verbs and nouns

Every adventure should have a common subset of verbs that are used in virtually every game that you might write. Some common verbs would be the direction ones, such as north, south, east and west, and you may care to include up/down as well, or northeast and all other compass points if you feel that way inclined, plus abbreviations like n, s, e, w, for easy players like myself. You can really appreciate that by having the first dozen verbs made up of:

```
2000 DATA north,south, east, west, up, down, n,s,e,w,s,d
```

we would also have to have the same dozen first nouns, in case someone typed in 'go north', or whatever.

Having got the directions sorted out, there are a number of other verbs that should be used in all your games. Not only does this standardisation help you to write, but it also gives the player a sense of continuity and a little bit of confidence in the knowledge that he can use words that he's encountered before. Here I'm thinking of words like 'help' (which is usually only use if there's enough memory left at the end of the game, a rare occurrence), 'inventory', 'save', 'restore' (never use 'load' to recall one's saved progress, as a number of adventures might require you to load a gun, for example), 'get' and 'take' (not to be confused with each other, they are not mutually exclusive and nor are they totally compatible - to use an old example, you 'take medicine' or 'you get medicine'. In the former you might swallow something and end up as a hideous demon, in the latter you might simply be carrying a bottle around with you), 'drop' and 'discard', 'wait' and 'remove', 'open' and 'close', and so on. I'm sure you can think of many other words that should be used in all adventures, but that is enough to be going on with. If including our direction verbs as well, we already now have 24 different verbs! And all this before we have even really begun to get started.

The rest of your verbs will obviously vary from adventure to adventure, although you may well want to have 'examine' and 'search' in all of your games. The remainder will come from two sources, the room descriptions and the problems that you have set the player. As a general rule you'll find that most of your verbs come from the problems, while most of the nouns will come from the descriptions. This is obviously a bit biased and fast rate, but if you are in the fortunate (and rare) position of having some spare memory left at the end of the game and you want to use that to flesh out the vocabulary a little bit, then there are the places to look.

So where might you begin? The easiest thing to do is to print out, for type, if you haven't got a printer! all the room descriptions that you're going to use, in all their glory. No abbreviations either, print out the entire description. You might have a sentence like "You are walking along a cobbled street". What would you do if you were the player, and saw a sentence like that? For one would want to 'examine cobble', but if your abbreviated room description said simply 'walking along street' you wouldn't, so the writer thinks of it.

Secondly, print or type out all of the problems and the solution. The very least you can do for the poor souls who are going to be playing your games is to ensure that they can solve them! Taking a 64 location adventure as an example, you might have set the player some 15 problems to solve, a 1 to 4 ratio is always reasonable. Thus the first thing the player might have to do is to

get out of a locked room, verbs and nouns immediately start to form, and if the situation to the problem requires the player to type it:

LOOK UNDER BUNK  
TAKE GOLDEN KEY  
INSERT KEY IN DOOR

Then you can see straight away where three verbs are coming from ('look', 'take', 'insert'), three nouns ('bunk', 'key', 'door'), an action word ('in') and three link words ('under', 'golden', 'key'). You find out that of the three link words, one ('under') is really an action word, while the other two ('golden' and 'key') will also be nouns. All this, and we've only had one problem so far!

Go through all your problems in this manner, and if you find yourself with a totally unwieldy number of verbs and nouns (anything more than about a hundred of each is getting a little bit too much for our humble Dragon), then set with the Thesaurus and hunt through for a few synonyms. Another words, try not to use different words at different times, so that a player specifically has to type in 'gather', 'called', 'take' or whatever. Use different words by all means, but do not have a vast amount of separate code for each one. Let the code do the work of sorting out specific instances.

Having gone through all your room descriptions (which you have got more or less prepared, haven't you?) and all your problems (some questions you should be in a very good position for coming up with



what will be almost your final vocabulary list. It wouldn't be, of course, adventures are just like any other program and tend to grow in the writing, so that what started off as a 300 word paragraph becomes the opening chapters of War and Peace, but at least it will be a start.

## Conclusion

Having done all that, we are now in a very

good position, and can start making concentrated effort in producing some code. First of all, we're going to have to get that parser working properly, having done all the work to produce the vocabulary for it, so try and get everything sorted out for next time, and try to be a little less apologetic about the parser for yourself. You never know what you might come up with, but don't worry if you give up in disgust. Rescue is at hand next month.

continued on page 26

```

310 I#B#A#B#R#CH#(5)  *Swedish
320 I#B#A#B#R#CH#(6)  *Italian
330 I#B#A#B#R#CH#(7)  *Spanish
340 I#B#A#B#R#CH#(8)  *Japanese
1000 *TEST PRINT ADDITION TO PRINT
    ONE LINE IN EACH TYPE STYLE
1010 *B. YEDMAN WALKER 1957
1020 TP#(1)=NN#
1030 TP#(2)=LN#
1040 TP#(3)=CN#
1050 TP#(4)=EN#
1060 TP#(5)=O#
1070 TP#(6)=NN#NE#
1080 TP#(7)=NN#OD#
1090 TP#(8)=NN#NE#OD#
1100 TP#(9)=LN#NE#
1110 TP#(10)=LN#OD#
1120 TP#(11)=LN#NE#OD#
1130 TP#(12)=LN#OD#
1140 TP#(13)=CN#NE#
1150 TP#(14)=CN#OD#
1160 TP#(15)=CN#NE#OD#
1170 TP#(16)=CN#O#
1180 TP#(17)=EN#NE#
1190 TP#(18)=EN#OD#
1200 TP#(19)=EN#NE#OD#
1210 TP#(20)=CN#O#
1220 TP#(21)=LN#EN#
1230 TP#(22)=LN#EN#NE#
1240 TP#(23)=LN#EN#OD#

```

```

1250 TP#(24)=LN#EN#NE#OD#
1260 TP#(25)=LN#EN#O#
1270 TP#(26)=CN#EN#
1280 TP#(27)=CN#EN#NE#
1290 TP#(28)=CN#EN#OD#
1300 TP#(29)=CN#EN#NE#OD#
1310 TP#(30)=CN#EN#O#
1320 TP#(31)=O#NE#
1330 TP#(32)=O#OD#
1340 TP#(33)=O#NE#OD#
1350 TP#(34)=LN#O#NE#
1360 TP#(35)=LN#O#OD#
1370 TP#(36)=LN#O#NE#OD#
1380 TP#(37)=CN#O#NE#
1390 TP#(38)=CN#O#OD#
1400 TP#(39)=CN#NE#OD#
1410 TP#(40)=CN#O#NE#
1420 TP#(41)=EN#O#OD#
1430 TP#(42)=EN#O#NE#OD#
1440 TP#(43)=LN#EN#O#NE#
1450 TP#(44)=LN#EN#O#OD#
1460 TP#(45)=LN#EN#O#NE#OD#
1470 TP#(46)=CN#EN#O#NE#
1480 TP#(47)=CN#EN#O#OD#
1490 TP#(48)=CN#EN#O#NE#OD#
1500 TP#(49)=O#
1510 TP#(50)=O#
1600 FOR N=1 TO 50
1610 PRINT#2,N,TP#(N);"
    YOUR Printing TEST";TP#
1620 NEXT N

```

# Pete GERBARD'S ADVENTURE TRAIL

**A STORMED** pastime, concerning Colossal Cave adventure (published for the Dragon by Caves Software, 23 Bristol Avenue, Manchester NH 03041 for \$9.95), has fallen into my grasp recently. It occurred to me that it might be of interest to anyone attempting to wade through this larger-than-usual Dragon adventure...

## JULY 1st

Some holiday this has turned out to be. That I, Professor Deadback, should be stuck on an 18-60 holiday with a bunch of nonessential justices, the very hearing of two Walkmen setting my teeth on edge, is intolerable. Fortunately, accommodation at the west house is better than expected, and having equipped myself with food and water (and poked up some rays and a lamp which had been carelessly discarded) will set off tomorrow and hope to leave my younger acquaintances behind.

## JULY 2nd

Last in forest, but soon found myself following an old stream down a valley. All water eventually disappeared through hole in ground, and stared at enormous steel grate for some time before obvious solution sprang to mind. Tied key and it worked! Hung on to key, though, have strange feeling that it might yet come in useful again. Walked underground some way, turned light on, and spent inappreciable night in small chamber. Strange footprints constantly invaded my dreams.

## JULY 3rd

Walkmen now just a nightmare, although am haunted by fear of bumping into Annika Ross. Thought my fears had turned to reality, but it was just a bearded dwarf who scurried away into the gloom as I screamed at him. Did three or six at once, which miraculously missed, otherwise he would have hit the rough edge of my tongue and no mistake. Unusual objects to be found hereabouts, and have added a gilded cage and a black rod to my list of possessions.

## JULY 4th

Spent several hours puzzling over bird found in splendid chamber. These rods at the thing in disgust, which missed at corner and sailed merrily on into another room. Bird now more than content to be caught and placed in gilded cage. What would David Attenborough have to say about that, I wonder? Retrieved not somewhat shamefacedly.

## JULY 5th

Found myself in a east hall. To one side, in a low room, was a gold nugget! Decided to leave it where I found it, country code and all that. Whodunnit Hall of Mountain King to myself, as am wont to do in moments of crisis, when heard answering whistle. Large snake in park, sticky cows, getting to more. Bird's twittering now refused to nerves as well, so thought "followed" with one snail and fed it to the reptile in the hope that, having eaten, it would go away. Imagine my surprise when watched belated and excited snail. Suppose blessed thing was feeding now, but we Deadbacks can be hard-hearted at times. Three cages instead. Just an entirely revised that that's the last I'll see of these rodents.

## JULY 6th

Unusual happenings. Was strolling back towards west house (weekend coming up) when saw unusual graffiti in debris room where'd I first found the black rod. "XVZZY" in red, in a flowery script. "WYZZY" I repeated (it sounded like tizzy to me) and was immediately overcome by strange, giddy sensation, and found myself in the west house! There's one for Paul Daniels to puzzle over! Muttered "XVZZY" again, but anyone listening, and back in debris room again! Hurried west, collected gold nugget and raced back to west house to store it safely, assuming any of my fellow holiday makers can be trusted. Said "XVZZY" once more, and spent a peaceful night in debris room. Much to ponder.

## JULY 7th

All sorts of rooms leading from this hall of mine. Had found some coins (placed in back pocket for safe keeping) and some jewellery in a south side chamber (must take it back to base sometimes) when stumbled across and almost into the east bank of a wide fissure. Nearly overbalanced in attempts avoid falling in the blessed thing, and waved rod to steady myself. Could hardly believe my eyes when a crystal bridge appeared from nowhere to span the chasm. One of Gauss's lines, it was, an achievement.

## JULY 8th

Crossed cautiously over bridge, and came on to west. Found some diamonds (rumor told last, that) and placed rod carefully on ground near to them. Am highly uncertain about that rod. A rod well-burned if you ask

me. Returned in some haste to east, back to the vanquished snake, and went north to the hall of the mountain king. Came on to north, and soon in north-south passage. Silver bars in foot, my lucky day obviously. Carried on to north, and saw a large Y2 carved on a rock. Why? Well I quipped, and so soon heard I spoken then a hollow voice said "Plugh." "Say Plugh to you too!" I was about to repeat, but barely had I spoken the first two words when was overcome by strange giddy sensation once more. I was back in the west house, and fearful of the startled gaze of my fellow holiday makers (gold nugget still there I noticed) whispered "plugh" quietly. Was back in Y2 room. Curled up next to rock and fell instantly into troubled sleep.

## JULY 9th

Decided to leave belongings here for time being. Reflected on bird, now to doubt wandering aimlessly about the caves. Tried to identify species, couldn't quite place it, and in momentary pang of conscience must have spoken loud. Perhaps it was a plover, and no sooner had I said the words "ray, power is a possibility" when room went giddy and found myself in something called the power room. A large enerated that my surprised gaze. Tried to carry it out of room but couldn't it through small crack in wall. Dropped everything save emergency, breathed in, and managed to squeeze out. Darkwood! Dropped enerated in my home and raced back into plover room and my belongings. Picked up lamp again and looked around. A large platinum pyramid. I saw some Auric ceiling a proprietary speaker that one, and withdrew! "raypower" I was back at my Y2 rock again. Power! One is rapidly becoming accustomed to strange magical events on this holiday.

## JULY 10th

Forward of anything, better tools, was going on long odd home with treasures when, scarcely two moves from my Y2 home, a bearded pirate pounced on me and stole my treasures! Thirty-nine prizes, gave chase naturally, and found myself in the west end of the hall of mine. Went south, and disused! I be amazed of handy passages, all the same. Blundered about in my terror, heading first east, then south, south and south again, north, off to the east, north, east, then finally in my desperation north west. Lo and behold, a pirate's treasure

chest, plus all my original treasures. Bundled them all together, staggered under the weight and headed southeast, north and north again I was back at Y2. Muttered "Thank you for that" and of course said once more whelped to the well house. Dropped all treasures. Back to Y2 once again, and discovered had left coins in back pocket after all. Couldn't be bothered with them, and fell soundly asleep.

#### JULY 19th

Holiday nearly over, and batteries of lamp starting to run out already. Went to hall of mists again, stumbled west and west once more into a long, featureless hall, then finally fell south into a maze of twisting passages. Also there are all different, and named in my desperation, turning west, north, east, east, east and east a fourth time. In front of my tired eyes I saw a large vending machine! Instant food over from thought and I deposited my coins into the machine. Instantly some fresh batteries fell out, and more by luck than judgement managed to lure west and then east in my confusion. Back in the featureless hall again, where I soon hurried home to Y2. Strange how one comes to regard these places as "home" after a while.

#### JULY 12th

A determined effort to see this thing through, now. From Y2 I went down and west, down and west, until I stumbled across bedquilt. For no other reason than west there, west west into a room whose walls resembled plain cheese, but being unable to stomach cheese under any circumstances I hurried east again... into a different room! A soft pillow for my bed was before me, and I poked it up and turned out. If going east wouldn't work, I attempted to go west but suddenly I was west north west instead. An oriental room, with a thing used! Placeback to Y2, "ughghgh" my way home and was about to drop the thingy vine to the floor when the pillow fell from under my arm and landed first. Fortunately it broke the fall of the vase! Placeback to Y2, could sense time running out, and once more to the oriental room, headed north and then west into a small alcove where, much to my amazement, the emerald was still waiting for me. Picked it up, scurried away and as luck would have it was back in the swirl cheese room again, headed roughly west and up into a secret north-south canyon, then going south to try and escape I found myself rose's scale with a fire-breathing dragon! "Pan my soul I had no time to spare, and it is never at this cruel blow that I have lost I attacked the beast myself! I should have known, with the condition of years laid into the animal fed before the are of an Englishman, turning behind a rather nice rug, further decoration for the well house. Scuttled back to Y2 and then the well house once more, depositing emerald and rug next to my rapidly growing pile of treasures. Time will not defeat me now, I am confident.

#### JULY 10th

An inauspicious date on which to explore anymore new, but find myself driven by powers beyond my comprehension, floundered into swirl cheese room, then east into

nest for is that two pit room. Tripped over slab of rock and fell into westernmost pit, almost smothering a small plant, which muttered "water water" at me. Took pit on it and entered it copiously. Perry Throver said both and ashes, the thing grew at a staggering rate, and had the nerve to better "water water" at me. Razed around for some water, and once more tried to drown the thing. It grew explosively, but I didn't get where I am today by climbing these things unprepared. Out of pit, east, then as chance would have it I tripped over a stone and fell down into the eastern pit this time, into a small pool of oil. Filled bottle, back to plant, drenched it, and in enormous act of Carves until progress halted by rusty door. Oiled it, went on and found a trident and a nest of golden eggs! Some dot had scrawled "see before too on the west, as illustrate obviously.

#### JULY 18th

Last day of holidays. Explored areas, and found myself in a sage room near bedquilt, with a clam in it. Fodder thing wouldn't open, so retreated for jewelled token and tried again. Snapped open, pearl fell out, and caught up with the room away. Razed treasures back to wellhouse, but kept eggs, food key and lamp with me just in case. Explored near bedquilt, and oriental room, and found myself on a rocky bridge just in front of a deep chasm. One step, roll appeared to block my path. Could spare him no time and threw the eggs at him. He vanished and I fairly sped across, until I was in a room with a large bear. Not thinking, I threw my foot at it, and it calmed down. Once I had undone the golden chain

that tethered it to the wall it followed me like a limpet, evincing great interest in some odd spices that I had found. Back to the bridge, and dropped the bear in flight at seeing the foot again. The bear scurried after the foot, which was wearing a stony expression, and I consoled myself with the thought that the two would, given time, manage to cross the great social gulf that divided them. Went back to read strange writing on wall where I'd first found the eggs, and said "be be be be" to myself. The eggs reappeared! Was about to raise home when voice told me that caves were closing. Couldn't get out! Wandered around, found myself transported into strange room with lots of rods, birds in cages, snakes, and all manner of things at once familiar and frightening. Picked up a rod, threw it away, went into another room and saw blast when I couldn't find the rod. Some hidden mechanism went off, a vast explosion started me with it, and from somewhere borders of cheering elves appeared and started me off in praise and glory. What would America have made of this, I couldn't help thinking?

#### JULY 15th

Am on my way home, laden down with treasure which I shall probably auction. I see the B&B club is organising yet more holidays. Perhaps I shall go on one when they do.

#### ME AGAIN

How could a chap like Professor Dradcock solve a complete adventure game, just like that, when the rest of us struggle for months and months? Perhaps we shall never know... bye for now!

## Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem, your name and address, and send it to: Dragon User Adventure Helpline.

1293 Little Newport Street, London WC2H 7PP. As soon as enough letters have arrived, we will start printing them in the magazine.

Don't worry — you'll not have Adventure that to write to as well!

**Adventure** .....  
**Problem** .....  
**Name** .....  
**Address** .....  
 .....

## Communication

**Problem:** Does anyone have a DOS version of Emerald or can write it? For the Dragon or Sindy. Have got the source of the Dragon classic version.  
**Name:** Marten "AMU" van Wieringen  
**Address:** 3 Lynevestraat, Dordrecht 3330, Belgium.

**Problem:** Has anybody got a copy of Emerald? I have managed to locate the one, 1940, have no hard copy and cannot remember where the program came from. Line 1300 reads PRINT in J4+11 64+6.0168114. —

I need the next line.  
**Name:** P. Neeb  
**Address:** 16 Calhoun, Pasco, Pennsylvania, Camden PE4 68E.

**Problem:** I have a copy of Pirat/Cricket and would like to copy the coloured grids without words onto a hard copy. Any body know of a way of doing this? Any help would be most appreciated.  
**Name:** Geoff Roberts  
**Address:** PL Appleyards Lane, Harrogate, Chester, Cheshire OJ4 7DT.



## CLASSIFIED ADS

**SPECTRUM+ 48K.** Joystick, interface and lots of games: £60 o.n.o. Damon Phillips, 604 Teyn Yn Efail, Gwynedd Cae Gwynedd, Ammanford, Dyfed SA68 1HY. Tel: Amman Valley (02899) 62390.

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### INTERNATIONAL FROM PAGE 1

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10496, 10560, 10624, 10688, 10752, 10816, 10880, 10944, 11008, 11072, 11136, 11200, 11264, 11328, 11392, 11456, 11520, 11584, 11648, 11712, 11776, 11840, 11904, 11968, 12032, 12096, 12160, 12224, 12288, 12352, 12416, 12480, 12544, 12608, 12672, 12736, 12800, 12864, 12928, 12992, 13056, 13120, 13184, 13248, 13312, 13376, 13440, 13504, 13568, 13632, 13696, 13760, 13824, 13888, 13952, 14016, 14080, 14144, 14208, 14272, 14336, 14400, 14464, 14528, 14592, 14656, 14720, 14784, 14848, 14912, 14976, 15040, 15104, 15168, 15232, 15296, 15360, 15424, 15488, 15552, 15616, 15680, 15744, 15808, 15872, 15936, 16000, 16064, 16128, 16192, 16256, 16320, 16384, 16448, 16512, 16576, 16640, 16704, 16768, 16832, 16896, 16960, 17024, 17088, 17152, 17216, 17280, 17344, 17408, 17472, 17536, 17600, 17664, 17728, 17792, 17856, 17920, 17984, 18048, 18112, 18176, 18240, 18304, 18368, 18432, 18496, 18560, 18624, 18688, 18752, 18816, 18880, 18944, 19008, 19072, 19136, 19200, 19264, 19328, 19392, 19456, 19520, 19584, 19648, 19712, 19776, 19840, 19904, 19968, 20032, 20096, 20160, 20224, 20288, 20352, 20416, 20480, 20544, 20608, 20672, 20736, 20800, 20864, 20928, 20992, 21056, 21120, 21184, 21248, 21312, 21376, 21440, 21504, 21568, 21632, 21696, 21760, 21824, 21888, 21952, 22016, 22080, 22144, 22208, 22272, 22336, 22400, 22464, 22528, 22592, 22656, 22720, 22784, 22848, 22912, 22976, 23040, 23104, 23168, 23232, 23296, 23360, 23424, 23488, 23552, 23616, 23680, 23744, 23808, 23872, 23936, 24000, 24064, 24128, 24192, 24256, 24320, 24384, 24448, 24512, 24576, 24640, 24704, 24768, 24832, 24896, 24960, 25024, 25088, 25152, 25216, 25280, 25344, 25408, 25472, 25536, 25600, 25664, 25728, 25792, 25856, 25920, 25984, 26048, 26112, 26176, 26240, 26304, 26368, 26432, 26496, 26560, 26624, 26688, 26752, 26816, 26880, 26944, 27008, 27072, 27136, 27200, 27264, 27328, 27392, 27456, 27520, 27584, 27648, 27712, 27776, 27840, 27904, 27968, 28032, 28096, 28160, 28224, 28288, 28352, 28416, 28480, 28544, 28608, 28672, 28736, 28800, 28864, 28928, 28992, 29056, 29120, 29184, 29248, 29312, 29376, 29440, 29504, 29568, 29632, 29696, 29760, 29824, 29888, 29952, 30016, 30080, 30144, 30208, 30272, 30336, 30400, 30464, 30528, 30592, 30656, 30720, 30784, 30848, 30912, 30976, 31040, 31104, 31168, 31232, 31296, 31360, 31424, 31488, 31552, 31616, 31680, 31744, 31808, 31872, 31936, 32000, 32064, 32128, 32192, 32256, 32320, 32384, 32448, 32512, 32576, 32640, 32704, 32768, 32832, 32896, 32960, 33024, 33088, 33152, 33216, 33280, 33344, 33408, 33472, 33536, 33600, 33664, 33728, 33792, 33856, 33920, 33984, 34048, 34112, 34176, 34240, 34304, 34368, 34432, 34496, 34560, 34624, 34688, 34752, 34816, 34880, 34944, 35008, 35072, 35136, 35200, 35264, 35328, 35392, 35456, 35520, 35584, 35648, 35712, 35776, 35840, 35904, 35968, 36032, 36096, 36160, 36224, 36288, 36352, 36416, 36480, 36544, 36608, 36672, 36736, 36800, 36864, 36928, 36992, 37056, 37120, 37184, 37248, 37312, 37376, 37440, 37504, 37568, 37632, 37696, 37760, 37824, 37888, 37952, 38016, 38080, 38144, 38208, 38272, 38336, 38400, 38464, 38528, 38592, 38656, 38720, 38784, 38848, 38912, 38976, 39040, 39104, 39168, 39232, 39296, 39360, 39424, 39488, 39552, 39616, 39680, 39744, 39808, 39872, 39936, 40000, 40064, 40128, 40192, 40256, 40320, 40384, 40448, 40512, 40576, 40640, 40704, 40768, 40832, 40896, 40960, 41024, 41088, 41152, 41216, 41280, 41344, 41408, 41472, 41536, 41600, 41664, 41728, 41792, 41856, 41920, 41984, 42048, 42112, 42176, 42240, 42304, 42368, 42432, 42496, 42560, 42624, 42688, 42752, 42816, 42880, 42944, 43008, 43072, 43136, 43200, 43264, 43328, 43392, 43456, 43520, 43584, 43648, 43712, 43776, 43840, 43904, 43968, 44032, 44096, 44160, 44224, 44288, 44352, 44416, 44480, 44544, 44608, 44672, 44736, 44800, 44864, 44928, 44992, 45056, 45120, 45184, 45248, 45312, 45376, 45440, 45504, 45568, 45632, 45696, 45760, 45824, 45888, 45952, 46016, 46080, 46144, 46208, 46272, 46336, 46400, 46464, 46528, 46592, 46656, 46720, 46784, 46848, 46912, 46976, 47040, 47104, 47168, 47232, 47296, 47360, 47424, 47488, 47552, 47616, 47680, 47744, 47808, 47872, 47936, 48000, 48064, 48128, 48192, 48256, 48320, 48384, 48448, 48512, 48576, 48640, 48704, 48768, 48832, 48896, 48960, 49024, 49088, 49152, 49216, 49280, 49344, 49408, 49472, 49536, 49600, 49664, 49728, 49792, 49856, 49920, 49984, 50048, 50112, 50176, 50240, 50304, 50368, 50432, 50496, 50560, 50624, 50688, 50752, 50816, 50880, 50944, 51008, 51072, 51136, 51200, 51264, 51328, 51392, 51456, 51520, 51584, 51648, 51712, 51776, 51840, 51904, 51968, 52032, 52096, 52160, 52224, 52288, 52352, 52416, 52480, 52544, 52608, 52672, 52736, 52800, 52864, 52928, 52992, 53056, 53120, 53184, 53248, 53312, 53376, 53440, 53504, 53568, 53632, 53696, 53760, 53824, 53888, 53952, 54016, 54080, 54144, 54208, 54272, 54336, 54400, 54464, 54528, 54592, 54656, 54720, 54784, 54848, 54912, 54976, 55040, 55104, 55168, 55232, 55296, 55360, 55424, 55488, 55552, 55616, 55680, 55744, 55808, 55872, 55936, 56000, 56064, 56128, 56192, 56256, 56320, 56384, 56448, 56512, 56576, 56640, 56704, 56768, 56832, 56896, 56960, 57024, 57088, 57152, 57216, 57280, 57344, 57408, 57472, 57536, 57600, 57664, 57728, 57792, 57856, 57920, 57984, 58048, 58112, 58176, 58240, 58304, 58368, 58432, 58496, 58560, 58624, 58688, 58752, 58816, 58880, 58944, 59008, 59072, 59136, 59200, 59264, 59328, 59392, 59456, 59520, 59584, 59648, 59712, 59776, 59840, 59904, 59968, 60032, 60096, 60160, 60224, 60288, 60352, 60416, 60480, 60544, 60608, 60672, 60736, 60800, 60864, 60928, 60992, 61056, 61120, 61184, 61248, 61312, 61376, 61440, 61504, 61568, 61632, 61696, 61760, 61824, 61888, 61952, 62016, 62080, 62144, 62208, 62272, 62336, 62400, 62464, 62528, 62592, 62656, 62720, 62784, 62848, 62912, 62976, 63040, 63104, 63168, 63232, 63296, 63360, 63424, 63488, 63552, 63616, 63680, 63744, 63808, 63872, 63936, 64000, 64064, 64128, 64192, 64256, 64320, 64384, 64448, 64512, 64576, 64640, 64704, 64768, 64832, 64896, 64960, 65024, 65088, 65152, 65216, 65280, 65344, 65408, 65472, 65536, 65600, 65664, 65728, 65792, 65856, 65920, 65984, 66048, 66112, 66176, 66240, 66304, 66368, 66432, 66496, 66560, 66624, 66688, 66752, 66816, 66880, 66944, 67008, 67072, 67136, 67200, 67264, 67328, 67392, 67456, 67520, 67584, 67648, 67712, 67776, 67840, 67904, 67968, 68032, 68096, 68160, 68224, 68288, 68352, 68416, 68480, 68544, 68608, 68672, 68736, 68800, 68864, 68928, 68992, 69056, 69120, 69184, 69248, 69312, 69376, 69440, 69504, 69568, 69632, 69696, 69760, 69824, 69888, 69952, 70016, 70080, 70144, 70208, 70272, 70336, 70400, 70464, 70528, 70592, 70656, 70720, 70784, 70848, 70912, 70976, 71040, 71104, 71168, 71232, 71296, 71360, 71424, 71488, 71552, 71616, 71680, 71744, 71808, 71872, 71936, 72000, 72064, 72128, 72192, 72256, 72320, 72384, 72448, 72512, 72576, 72640, 72704, 72768, 72832, 72896, 72960, 73024, 73088, 73152, 73216, 73280, 73344, 73408, 73472, 73536, 73600, 73664, 73728, 73792, 73856, 73920, 73984, 74048, 74112, 74176, 74240, 74304, 74368, 74432, 74496, 74560, 74624, 74688, 74752, 74816, 74880, 74944, 75008, 75072, 75136, 75200, 75264, 75328, 75392, 75456, 75520, 75584, 75648, 75712, 75776, 75840, 75904, 75968, 76032, 76096, 76160, 76224, 76288, 76352, 76416, 76480, 76544, 76608, 76672, 76736, 76800, 76864, 76928, 76992, 77056, 77120, 77184, 77248, 77312, 77376, 77440, 77504, 77568, 77632, 77696, 77760, 77824, 77888, 77952, 78016, 78080, 78144, 78208, 78272, 78336, 78400, 78464, 78528, 78592, 78656, 78720, 78784, 78848, 78912, 78976, 79040, 79104, 79168, 79232, 79296, 79360, 79424, 79488, 79552, 79616, 79680, 79744, 79808, 79872, 79936, 80000, 80064, 80128, 80192, 80256, 80320, 80384, 80448, 80512, 80576, 80640, 80704, 80768, 80832, 80896, 80960, 81024, 81088, 81152, 81216, 81280, 81344, 81408, 81472, 81536, 81600, 81664, 81728, 81792, 81856, 81920, 81984, 82048, 82112, 82176, 82240, 82304, 82368, 82432, 82496, 82560, 82624, 82688, 82752, 82816, 82880, 82944, 83008, 83072, 83136, 83200, 83264, 83328, 83392, 83456, 83520, 83584, 83648, 83712, 83776, 83840, 83904, 83968, 84032, 84096, 84160, 84224, 84288, 84352, 84416, 84480, 84544, 84608, 84672, 84736, 84800, 84864, 84928, 84992, 85056, 85120, 85184, 85248, 85312, 85376, 85440, 85504, 85568, 85632, 85696, 85760, 85824, 85888, 85952, 86016, 86080, 86144, 86208, 86272, 86336, 86400, 86464, 86528, 86592, 86656, 86720, 86784, 86848, 86912, 86976, 87040, 87104, 87168, 87232, 87296, 87360, 87424, 87488, 87552, 87616, 87680, 87744, 87808, 87872, 87936, 88000, 88064, 88128, 88192, 88256, 88320, 88384, 88448, 88512, 88576, 88640, 88704, 88768, 88832, 88896, 88960, 89024, 89088, 89152, 89216, 89280, 89344, 89408, 89472, 89536, 89600, 89664, 89728, 89792, 89856, 89920, 89984, 90048, 90112, 90176, 90240, 90304, 90368, 90432, 90496, 90560, 90624, 90688, 90752, 90816, 90880, 90944, 91008, 91072, 91136, 91200, 91264, 91328, 91392, 91456, 91520, 91584, 91648, 91712, 91776, 91840, 91904, 91968, 92032, 92096, 92160, 92224, 92288, 92352, 92416, 92480, 92544, 92608, 92672, 92736, 92800, 92864, 92928, 92992, 93056, 93120, 93184, 93248, 93312, 93376, 93440, 93504, 93568, 93632, 93696, 93760, 93824, 93888, 93952, 94016, 94080, 94144, 94208, 94272, 94336, 94400, 94464, 94528, 94592, 94656, 94720, 94784, 94848, 94912, 94976, 95040, 95104, 95168, 95232, 95296, 95360, 95424, 95488, 9555

# Make a note

*Feeling crotchety? Sound out Gordon Lee's latest puzzle*

LAST MONTH, while discussing some oddities connected with the number 7, we noted that, of all the digits, 7 was the only one for which there was no easy test for divisibility. By "easy test" we mean a quick method by which we can determine if a given number is an exact multiple, without having to actually work it out. Before the advent of computers (and pocket calculators), this was often an important consideration, and much time and effort could be spared by use of such tests. Even with the use of computers, knowledge of these tests can still have their applications. For example, a computer may be quicker, and so speed the execution of a program, or, the mathematical accuracy of the computer may be pushed to its limit and possibly produce questionable results. Again, the number under test may be longer than the nine or so digits that an eight-bit micro can handle.

Outlined below are some simple tests for divisibility by numbers from 2 to 10, without, as has been mentioned, the number 7. "Divisibility" means exactly divisible, without remainder.  
2: A number is divisible by two if the last digit is even.  
3: If the digital root of a number is divisible by 3 then the number itself is also divisible by 3. Not quite as well known is the fact that if the digital root results in a remainder, that is the actual remainder that would occur if the actual number were divided. For

example, the number 1234567894321 has the digital root 4. This leaves a remainder of 1 when divided by three, so the 13-digit number itself would leave this remainder. Readers who are not familiar with the term "digital root" should refer to this page of February's Dragon User.

4: If the last two digits of the number is exactly divisible by 4, then the complete number will be. It doesn't matter how many digits are in the actual number (so long as we know the final two), we can establish the test for divisibility. Any remainder will be that resulting from division into the complete number.

An everyday use of this test is in determining "leap" years. If the last two digits of the year is exactly divisible by 4, then (subject to certain other considerations) the year is a leap year.

5: Only if the final digit of the number is a zero or a five, is the number exactly divisible by five. Any excess over zero or five, will indicate the remainder.

6: As six is the product of 2 and 3, every multiple of six will pass the test for both 2 and 3, in other words, it must be an even number with a digital root divisible by 3.

8: Take the last three digits of the number. If this is divisible by eight, then the complete number will be also. If there is any remainder, then this represents the remainder from the complete number. As a general principle, this rule applies to all powers of 2. Thus, to test for divisibility by 2n, it is only

necessary to consider the last n digits of the number. Therefore, to test for divisibility by 16 take the last four digits, and so on.  
9: The test for nine is similar to that for three. If the digital root of the number is nine then the number itself is a multiple of nine. Otherwise, any remainder will be that found in the actual division. For an example of this test see Problem 2 on the competition page of last August's Dragon User, and the solution given in the following month.  
10: This is really too obvious to need stating, but a number divisible by 10 must end in zero. If it does not, the final digit will equal the remainder.

11: To test for divisibility by 11, start at the units digit and add and every alternate digit, proceeding to the left. Call this total X. Now, add together the other set of alternate digits and call this total Y. Find the result of X minus Y. If this result is a positive multiple of eleven, then the number is divisible by eleven. To find the remainder if the division is not exact, either: if the total is positive, subtract the highest multiple of 11 which is lower than the total. This will be the remainder. If the total is negative, add a multiple of eleven to bring the value to just above zero. This will be the remainder.

For example, the number 12372981 should be tested as follows:

$$\begin{aligned} X &= 1 + 3 + 7 + 9 + 2 = 22 \\ Y &= 2 + 3 + 7 + 2 + 1 = 15 \\ X - Y &= 7 \end{aligned}$$

To minus 22 add the next highest multiple of eleven (33) that will make the value positive. The result, 5, indicates the remainder.

In this column in the past, it has been remarked that all palindromic numbers with an even number of digits must be a multiple of eleven. With the above proof, this statement is not difficult to understand.

And, finally, 12: As twelve is the product of 3 times 4, neither both of these numbers should prove positive for all multiples of twelve.

This concludes this quick survey of divisibility tests, which may prove useful to number theorists and potential competitors alike—and if members of the competition are usually boyish men, this month we have a musical competition in more ways than one.

Prizewinners this month can win a copy of the new Music Maker routine from John Penn Software, and the competition is based on the name of this program.

Using the words MUSIC MAKER, take the nine digits 1 to 9 (zero is not used), and assign a different digit to each different letter in the above name. This must be done in such a way that the five-digit values represented by both MUSIC and MAKER are both perfect squares.

In how many different ways can you carry out this qualification, if we make sure that for each pair of values, MAKER is higher than MUSIC?

## Prize

Music Maker is a new package which will play music you tape into it in four parts, teach you to read music (if you like), and save your tunes as machine code routines. John Penn Software has contributed ten copies of this, one of the lowest priced packages on their extensive list, for the ten most inspired entries. The ten winners will get £200 discount vouchers from the Penns.

## Rules

Listen closely to the wise words of Gordon Lee, compose your responses, get your Dragon to re-enter on a printout, and mail your copy, with any notes you wish to add, to Dragon User in an envelope marked JLUJ COMPETITION. Don't forget to include your name and address. Don't forget to include our name and address, either.

Now for this month's September (go on, ask me to write a tune... I will write on two of those "songs by singers" titles which have been the mainstay of July pages since the days of Adam.

You know, "How much is that doggie in the window?" by Bach. This song is over" by Buster King. That sort of thing. As many as you like, but one sharp one beats a dozen flats. Extra points for Dragon references.

## April Winners

Winners? I thought. Not many entries... then I found an April on top of the May page and a May on top of the April page. Panic over.

Panic begins again. Really took a lot of sorting, this lot.

The prizes are 20 copies of Ringwood, the ultra popular semi-adventure from Microcad. And they're sitting in my shelf ready to go. The lucky recipients are:

M. Armstrong of Birmingham, J. Hewitt of Histon, Fred Wilkes of Barnfield (best poem, definitely, but too long to print here), Alan Thomas (second best poem), Olive C. Scott of Ashstead, Terry Potter of Chesham, Denis O'Malley of Condonston, Phil Rogers of Liverpool, John B. Blatch of Addlestone, PG Matthews of Tipton, Ian Higgins of Camphill, Colin Miller of Connersbridge (see you drop us a line please, Colin, your address is indispensable), H. Christian of Thirsk, E.A. Rosemary of Addlestone, Robin J. Tatham of Sale, Dave Lander, Richard Longol Cambridge, P.J. Taylor of Aycliffe, Keith Davis of Grantham and S.A. Siddiqui of Chislewick.

Just for the record, the most popular rhyme for "tangle" was "wangle".

## Solution

The answer will appear in the next issue.

## JUST IN !!

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